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THE South African MINING AND ENGINEERING JOURNAL

Established 1891 Published every Saturday

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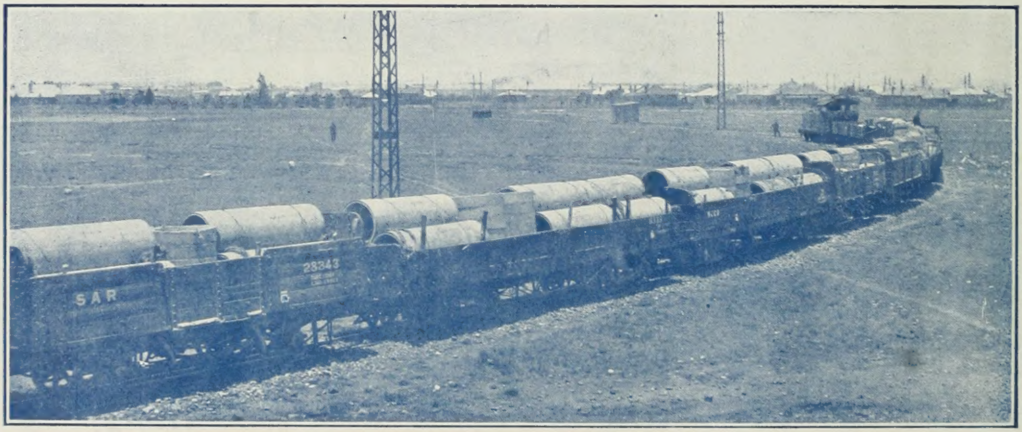

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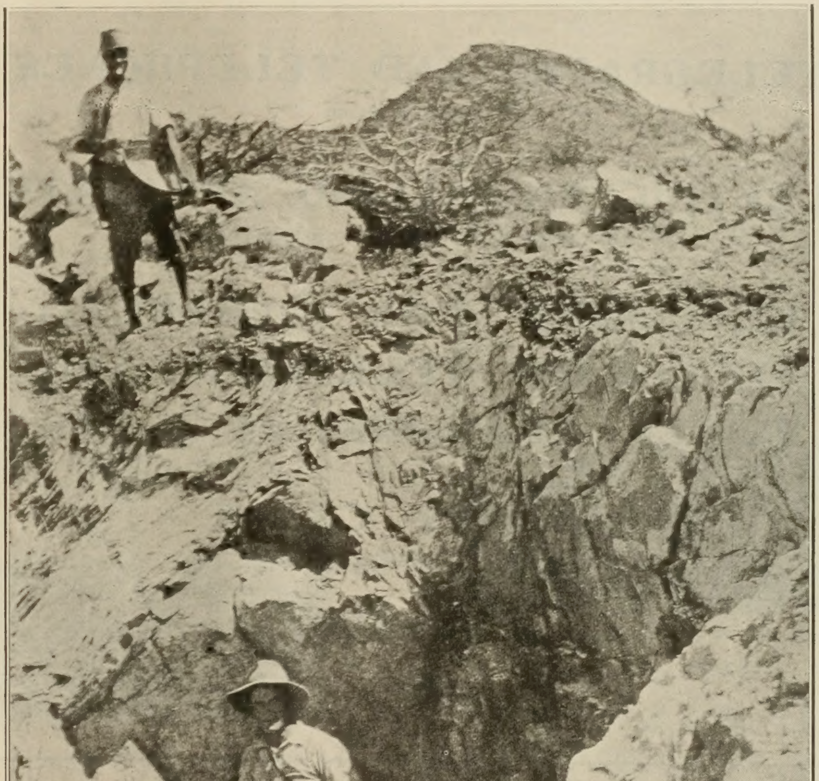
Established 1891.

Vol. XXXI., Part I. JOHANNESBURG, TRANSVAAL, SATURDAY, MAY 21, 1921. No. 1547.

Cassiterite Lode at Paukwab S.-W. Protectorate.



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The Improved Outlook for the Edendale.

THE FINANCIAL POSITION—ENCOURAGING DEVELOPMENT—EXCELLENT ASSAYS—NEW VERTICAL SHAFT.

In the following article we sketch the financial position of the Edendale Developing Syndicate, which is raising further capital to sink another vertical shaft to develop the very promising silver-lead mine at Edendale. A visit to the mine affords convincing testimony to its great potentialities; and the high values of the concentrates and excellent assays from the ore developed promise a highly successful future.

From time to time we have printed encouraging reports from the Edendale Silver Lead Mine, and steady progress continues to be made in developing the mine. We understand that Messrs. Quinton and Manisty have now secured an extension of the option over the property, increasing it from three to five years, reckoning from April 1, without any alteration in the terms or conditions of the lease. The terms of the option, it may be remembered, were of the most favourable description. As showing their faith and confidence in the ultimate success of the property, the directors have personally guaranteed an overdraft at the bank to enable development to be vigorously pursued. At a recent meeting of the board of directors, however, it was resolved to raise further capital at par by means of an issue of shares payable 5s. on application, 2s. 6d. on allotment, and thereafter 2s. 6d. per month. Certain shareholders have already agreed to underwrite a large portion of this issue. It is estimated that a further £3,000 will be required to bring the mine to the producing stage. The underwriters of this issue will receive an equivalent number of options at par for twelve months, and subscribers to the issue will also enjoy similar rights and privileges. To brokers and underwriters the company is also paying ten per cent. commission. This modest financial scheme should amply suffice to complete the new vertical shaft and put the mine in a position to realise its possibilities.

No. I. Shaft Headgear, Edendale.

Position at the Mine.

Through the courtesy of Mr. J. H. L. Manisty, a special commissioner of this paper was recently enabled to pay a personal visit to the mine. He visited the underground working in the company of the energetic manager, Mr. H. Hicks, and he was impressed by the undoubtedly great possibilities of the property, which, it would seem, has never yet been given a fair chance. The chief feature of the work done since last the property was described in detail in these columns is the sinking between Nos. 1 and 2 shafts of No. 3 prospecting shaft to a depth of 55 feet This shaft was connected up with the drive of the 83 feet level of the No. 2 shaft. This drive was continued west from the prospecting shaft for a distance of 118 feet under the cerussite. The width of the reef has averaged 18 inches carbonate of lead and first-class ore. A winze sunk 17 feet west of the No. 3 prospecting shaft to a depth of 9 feet between two well-defined walls showed an average width of reef of 54. inches. The results from this winze, which is the lowest point in the section, are most encouraging. From this 118 feet drive and a stope in it assay results were as follows:—

Five Stamp Mill and Engine, Edendale.

First-class ore: 41 tons assaying 81 per cent. lead, 10 oz. silver per ton.

Concentrates: 16 tons assaying 71 per cent, 5.4 oz. silver per ton. All of this has since been disposed of at very satisfactory prices.

These excellent results from these comparatively shallow workings point to even better things at the 100 foot level. That the occurrence is a true fissure vein is proved by the fact that from the point where the reef is exposed in the No. 2 shaft to the present face west of No. 3 prospecting shaft, a distance of 700 feet, the reef is continuous and without break over a good stoping width.

New Shafts.

Another prospecting shaft is being sunk 176 feet west of the No. 3 prospecting shaft. The shaft is down 31 feet, and the width of reef is 40 in., looking very promising. The total length of the line of reef to the boundary going west from No. 3 shaft is 352 feet. On the eastward side the boundary is distant over three miles. The total length of reef exposed is 697 feet. The directors have now decided on a new vertical shaft, and considerable progress has already been made. It is estimated that, provided there are no water troubles or timber shortage; this new shaft will be completed to the reef by the middle of next month. It is proposed at a later date to erect a small smelter to deal with all the concentrates on the spot. Enough has been written to show that the property has excellent prospects and that a laudable spirit of enterprise is being displayed by those responsible for its opening up. The manager, Mr. H. Hicks, was manager of the property eighteen years ago, when a company with a capital of £240,000 was engaged in developing it. The lessons of the past have not been learned in vain; and the knowledge and experience of the property accumulated in the course of the years are, it seems to us, being turned to good account to-day. All the past records of the mine, and the many detailed and enthusiastic reports that have been made upon it by well-known engineers are in the possession of the present directors, and they are naturally making full use of that invaluable information. In view of the better outlook in the market for their products and the consistantly improving values from the mine in depth, we have no hesitation in expressing our confidence that, in its present hands, the old Edendale, after its long and chequered career, now, at last, looks like coming into its own!

No. I. Shaft Headgear, Edendale. Another View, Showing Reduction Works.

New Vertical Shaft, Edendale.

TRANSVAAL ALLUVIAL DIAMONDS.

The following are the particulars of alluvial diamonds produced in the Transvaal Province during the month of March:

Farm.	Carats.	Value.	No. of Claimholders.
Bloemhof	278¾	£1,211	227
Blesbokfontein	887¼	3,996	143
Bloemheuvel	28	183	5
Brandywynkuil .	8½	30	1
Boschplaats	11	43	1
Biesjeslaagte .	18¾	216	2
Cawoodshope	7¼	29	10
Christiana	26½	223	8
Dievedraai . . .	8½	55	13
Doornbult ...	7¼	23	1
Eerstebegin .	11¼	81	2
Fairview .	1½	6	1
Goedgenoeg	8¼	62	19
Goedehoop	18¼	60	3
Goedgevonden	11	30	1
Grootdoorns ...,	14¾	40	1
Ganspan . .	4	19	1
Hollowsya Rust	5	9	1
Kalkfontein	11¼	71	1
Kareepan .	164¼	626	57
Kareepan	185¾	782	72
Kaalpan .	73¼	232	24
Kareeboom	989¾	1,407	349
Kromellenboog ...	31¾	141	7
Klipkuil	68½	151	7
Klippan .	2¼	23	2
Kameelkuil	687½	4,801	135
London	289¼	1,130	67
Leeuwfontein	71¾	371	36
Mooifontein	29¼	136	7
Mimosa .	5½	16	1
Olievenfontein	7¾	45	2
Plessisdam	208¼	1,188	34
Rietput	10¾	34	2
Rietkuil	167	840	62
Rondevlei	15¼	53	1
Syferfontein .	117¼	629	1
Sufergat	40½	201	3
Sandringham .	36	190	1
Schweizer Reneke	243	1,555	181
Vechtvallei	8	32	1
Vuurfontein . . .	8½	60	1
Zwartlaagte .. .	256½	1,407	112
Zevenfontein .	93½	586	22
Totals	5,178	£26,227	1,624
PRETORIA.			
Bynespoort	721½	1,074	319
Kameelfontein ..	150¼	689	13
Totals . .	871¾	£1,763	332

LATEST PATENTS.

The Leeds Forge Co., Ltd., and Herbert Nigel Cresley.—Improvements in or relating to railway or tramway vehicles.

Harold Curtie. Electrical doublepole switching plug.

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Albert William Daw and Zacharias William Daw. -Improvements in or relating to rotary engines, pumps and the like.

The Transvaal Coal Export Trade.

NEW EAST COAST HARBOUR IN THE UNION ADVOCATED—DELAGOA STILL A FOREIGN PORT—IMPORTANT DEVELOPMENTS PENDING.

By A. Danks.

We print below the interesting views of a well-informed and frequent contributor to our colunms, on the vexed question of Delagoa Bay and the Transvaal coal export trade. Needless to say, we do not necessarily subscribe to all the statements made by our outspoken contributor.

Sir Abe Bailey perhaps made a mistake when referring to our neighbours in his recent speech as unprogressive and effete. You in your editorial rectify that in describing the Port of Delagoa, which undoubtedly has gone forward by leaps and bounds recently, but you are entirely wrong in saying the Union Government has committed a breach of faith in connection with the Swaziland railway. That agreement was entered into before the Act of Union and was not entered into by elected representatives of the Union States. Quite rightly, immediately elected members took over the reigns of Government they declined to be bound by a policy that would for all time have put the whole economic prosperity of the Eastern Transvaal, if not the whole Transvaal, at the mercy of a foreign nation. It is all very well for our friends down there to speak of breach of agreement. If Lord Milner's policy has put them to any pecuniary expense which they feel they have incurred and not likely to recover from the railway to Goba, by all means let us foot the bill, but for this free country to be bound by that foolish agreement for all time would be suicide. I want to be candid and without malice to our friends down there, but have they studied the history of the Balkan States? At home, they have a long seaboard and no troubles, but what of the troubles of countries like Montenegro, Serbia, Albania and many others who are all dependant on getting their exports to the world's market on the whim of a foreign country. All their imports are scrutinized.

The Portuguese: A Businesslike People.

To-day we are very friendly, but what is the price of that friendship?

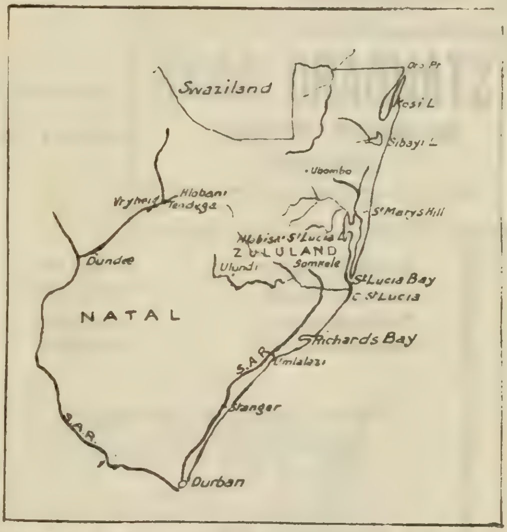
That is where Sir Abe belittles their business capacity. They are in the position of a trader who has a monopolistic article for sale and knows the buyer cannot do without it. What are the terms of the modus vivendi?

We draw native labour from their Province. We export coal and other materials through their port.

What sort of a bargain did "our friends" make for this service? Fifty to 55 per cent. of the competitive Transvaal imports have to pass through that port. What too, about the huge income they draw from native passes and recruiting fees? What, too, of the regulation about the native wages having to be paid in such a way that large, very large, sums fall to be taken to Mozambique Province yearly? The Portuguese are not spending the money on the improvements. They do it just now, but ultimately *our* trade has to pay for it and the harbour remains their property. It is not for sale, writes a Portuguese gentleman in *The Star* of 14th inst.: No, it is too good an investment to be for sale.

The Business Aspect.

When a business firm cannot get its requirements at a reasonable rate, it sets about to find another market or manufacture their requirements themselves. Why should we develop Delagoa to suit our friends? Why should this free Union subscribe to a railway policy to open up Swaziland, which is not an integral part of the Union and does not share the Union's burdens? By all means let us remain on friendly terms with the Portuguese and for all the traffic which naturally gravitates to that port we shall be glad of their facilities to handle, but for development of Swaziland, *NO*. For the purpose of influencing one ton of material which can be served equally well by a port on Union ground, *NO*. Let readers take a map of South Africa, particularly that part which gives in detail the Eastern Transvaal and Zululand. Examine carefully the lie of that country and the known position of its mineral wealth.



The Natal Coast, Showing Four Possible New Harbours.

Four Potential Harbours.

On the north coast of Zululand there are four (at least) places where it is known good harbours can be constructed. These are Richard's Bay, St. Lucia Bay, Lake Sibaya, or

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MANAGER'S CERTIFICATE (METALLIFEROUS). We secured 15 Passes from 19 Entries in two recent examinations, and in the last (Jan. 1921) examination secured 7 passes from 8 entries. Another percentage record!
MANAGER'S CERTIFICATE (COAL).—New Class recently started. Candidates being enrolled.
MINE SURVEYORS' CERTIFICATES.—We have secured 55 Certificates to date, and lead with passes by more than 10 to 1.
OVERSEER'S CERTIFICATE.—We lead with passes, 1918 and 1919. 21 Certificates secured during 1920 Overseers' Class (Coal) recently started.
PRELIMINARY SURVEY.—We have trained the majority of the Assistant Surveyors working in the Mines.
WRITE FOR PARTICULARS AND CLASS TIME TABLE.
CORRESPONDENCE TUITION WHERE PERSONAL TUITION IS IMPOSSIBLE.
C. D. LUCAS and B. E. WOLFE,
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a small bay near it which I only know by native name, and Kosi Bay. Richard's Bav has been very favourably reported on by a harbour engineer of high repute, who says it will make as good or better a harbour than Durban.

St. Lucia Bay is also strongly in the running by competent authorities. Lake Sibaya and Kosi Bay are not so well-known, but those who have resided there speak highly of them.

The north coast railway already passes Richard's Bay and its present terminus, Somkeli, is only 120 miles from Hlobane, and there is nothing serious in railway construction along the route.

St. Lucia Bay is about the same distance and offers greater inducements from a mineral point of view. But, for serving the Eastern Transvaal as well as Delagoa as regards the coal mines at Witbank, and vastly superior as regards all the district lower down, there is nothing to compare with Kosi Bay or Lake Sibaya and a railway up the Pongola to Paulpietersberg. The distance from Paulpietersberg as the crow flies is only 120 miles. The railway is up a natural valley, and like the Canadian Prince Rupert Harbour and Railway, it can be made to handle coal and the railway graded to carry coal down in maximum loads with minimum expenditure. The distance by rail would be about 150 miles from the sea to Paulpietersberg, and from there to Breyton by the existing line is 135 miles. Breyton would thus be 288 miles from the new port. Witbank is 280 miles from Delagoa. A new line from Bethel to, say, Blackhills, combined with a properly constructed new railway, would enable the whole of the Transvaal trade to be more economically carried through our own country to our own port than it ever can be carried to that of our friendly but shrewd neighbours.

No one wants to be other than friendly with the Delagoa administration, but friendship, if it has to be courted at the expense of our country's future, can be too dearly bought, and we have ourselves and our heritage to think of.

The Case of Swaziland.

As regards Swaziland, although not in the Union, it is British territory, and we cannot ignore it altogether, although if they want a railway, why don't they raise money themselves and have it built? *Their* taxes and debts are small enough. Let them get a move on without asking from others, who have more than enough to do to develop their own resources. Besides, a branch from a railway up the Pongolo would serve them equally well and it would be *All Red*.

The Purchase of Delagoa Bay.

As for Sir Abe Bailey, I have always had a high opinion of him as a far-seeing business man who had honestly the interests of the country at heart. His motives in wishing to purchase Delagoa Bay are to us clear of self-interest, but I thought his vision was broader and that he could have seen that no development of a foreign port was ever likely to fulfil the wants of this country. That the money we are at present spending on deviations, etc., to better this difficult railway to Delagoa would go a long way to build the new railway to the north coast, and the money he would propose to hand to the Portuguese would be more than ample to build both the railway and harbour of our own, even if amplified on the most extravagant style, besides opening up a vast region of our own country rich in all natural resources.

Broad Views Necessary.

There was a time when it would have been advantageous for this country to buy Delagoa Bay, and it *could* have been bought cheap enough, notwithstanding repeated disclaimers from our friends, but that time has passed, and we can do without it now. Only no more time must be lost, no more little parochial smallness of vision must be allowed to interfere with the development of this country. The day is not long past when Pietermaritzburg vetoed a proposed deviation to obviate the climb of 784 feet from that sleepy hollow to Thornville Junction on the downward way, and part of that stiff climb of 1,485 feet from Pietermaritzburg to Hilton Road on the inland side, and the votes of the vested interests along the present line, Pietermaritzburg-Estcourt-Ladysmith, etc., stopped the alternative line surveyed up the Tugela Valley and Durban blocked all proposals for another harbour. These little mean traits must no longer carry weight. There is room for all, and it is not possible for everyone to have the only railway in his own garden, and if he cannot, he must not try to block the others from getting ahead. Durban has as much as it can cater for earmarked for it already. The Northern Transvaal and part of the Low Veld are Delagoa's natural sphere of supply, but for all the Eastern Transvaal, as far west of this town, there is only one harbour, and that is the best one of the four named in this article. The best authorities must be consulted and the best one chosen.

A. DANKS.

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MINES DEPT. EXAMS., 1920.
CERTIFICATES AWARDED INSTITUTE.

SURVEYOR'S CERTIFICATES — March, July and October (Extra) Exams. 100 %, 50 % and 66 % respectively of S.A. total.

MANAGER'S CERTIFICATES. — Two last Exams. (Sept., Jan.) 17 out of total 28 in S.A

OVERSEER'S CERTIFICATES.—Two thirds of the S.A. total for year 1920. 75 % for January, February, March, 1921.

COAL CERTIFICATES.—Candidates being enrolled

Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St.

The Parlous Plight of the Luipaardsvlei.

DIRECTORS TAKE MEN INTO THEIR CONFIDENCE—THE PLAIN ISSUE—REDUCED WAGES OR NONE!

The falling gold premium without any commensurate diminution in the cost of stores has caused the directorate of the Luipaardsvlei Estates Gold Mine seriously to take stock of the position of that property, with the result that the trade union organisations have been notified that unless employees are prepared to shoulder the burden of the position it will be necessary to close down the property immediately. With a view to frankly placing the position of the company before those concerned, the directors have met the West Rand branch of the South African Industrial Federation.

Mr. J. Andrew Cohen, in explaining the position at the meeting, said the company had practically come to the end of its resources. During the last four months the company had lost £9,000, and there was no means of obtaining further assistance to continue operations, and unless the employees of the mine agreed to a reduction of wages they would be reluctantly compelled to close down. Whilst they undertake to respect all agreements entered into by the Chamber of Mines with the various trade unions, they could only do so as long as the company's finances permitted the operation without loss. Now the time had arisen when they could no longer do so. Their purpose in meeting the representatives of the trades unions was to suggest that the employees of the mines should have opportunities of meeting the directors, when the whole position would be placed clearly before them, and it would be pointed out that unless a voluntary reduction of wages was agreed to they would be compelled to close down the property.

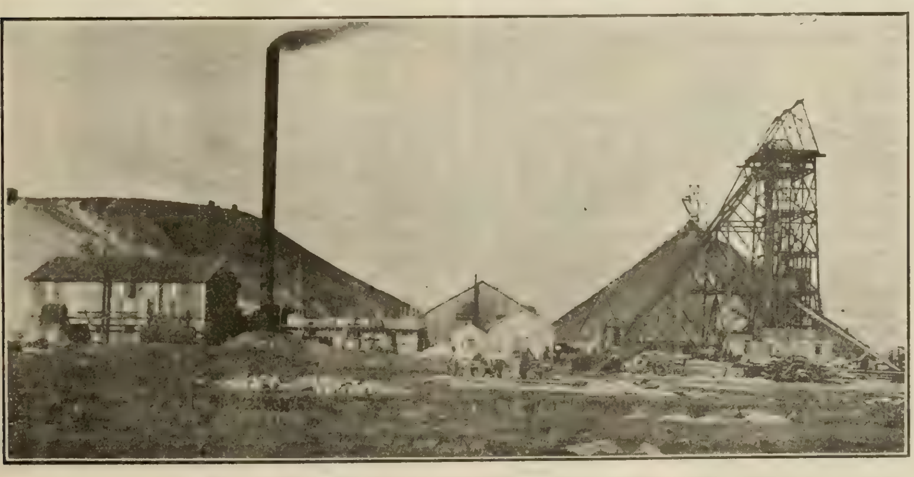
A suggestion put forward was that a day pay man should agree to forego the war bonus granted in October, 1919, which would mean an approximate saving of £1,400 to £1,500 per month. In such an event it would be possible to tide over the present period, in an anticipation of a further reduction of working costs as a result of stores coming down to the pre-war figure.

Mr. McDowell, secretary of the West Rand branch of the S.A.I.F., on behalf of the trade union representatives present, agreed to put the whole case before the head office of the Federation, and to arrange for the Directors to meet the men on the property for the purpose of hearing whether they would voluntarily accept a reduction of wages.

The Closing of the Messina Mine

From Messina we hear that the rumours regarding the mine came to a head when the manager received a telegram on Friday, 29th ulto., from the chairman of the company, instructing him to close down the mine. The news, though not unexpected, caused consternation in town, and Mr. Chamberlain, on behalf of the Farmers' Union, called an emergency meeting which was attended by Mr. Emery, the mine manager, to consider the position with reference to the Zoutpansberg. Notwithstanding the short notice given, the meeting was very well attended. Mr. W. Vorster, M.P.C., was present, and was elected to the chair. He explained the purpose of the meeting, and then asked Mr. Emery to explain the mine's position with regard to the guarantee. When Mr. Emery had finished, questions were put to him, and many a point was elucidated. A general discussion then took place, all the speakers realising the importance of the mine to the district, and more especially to the farmers behind the mountains. It was eventually decided to send a deputation (consisting of Messrs. Chamberlain, J. van Breda, and S. A. Cilliers) to Capetown, to secure, if possible, an interview with the Prime Minister and the Minister of Railways, and to ask the latter to go into the matter again with a view to reconsidering his decision. The deputation was joined by several influential men from the Pietersburg district.

Progress at Randfontein Central.



Randfontein South Vertical Shaft Headgear and Surface Works.

Coal Commission's Report : Some Trenchant Criticism!

A CLOSELY REASONED REPLY TO THE GRADING AND POOLING RECOMMENDATIONS OF THE COMMISSION.

Below we print the first really serious criticism that has been evoked by the recommendations of the Coal Commission. It comes from a prominent member of the coal export trade, and it certainly seems worthy of careful consideration by all concerned.

A gentleman who is prominently identified with the coal export trade has favoured us with the following views on the report of the Coal Commission, as summarised in our columns recently.

"I should like to briefly indicate one or two opinions I have formed as the result of this superficial examination. You will, of course, appreciate that such opinions may be subject to considerable modification when the full text of the Commission's report is published and the policy of the Government thereon declared. To begin with, it would appear that the necessity for urgency in this matter has largely disappeared, and for this reason I hope the Government will not press this measure this session, but rather delay it so as to allow the fullest consideration to be given to the many radical changes proposed in the conduct of this important trade.

To deal with the summary:

Grading.

Clause (a).—*The grading of coal for export and bunkers will enhance the reputation and value of South African coal, and be of benefit to the industry.*

Although asserted by way of an axiom, this statement is really subject to a great many very obvious qualifications. Grading to enhance the reputation of South African coals might, and probably would, do so at the expense of the majority of coal producers. It would also involve the stoppage of the mining of average Transvaal and Natal coals, and this would be a loss to the industry as well as to the country. The setting of a high standard in grading would therefore be in the interests of one or two mines, but would be against the interests of the trade as a whole. Mr. W. J. Wybergh raises this point very clearly in his report on our coal supplies. He characterises the standard of 12.5 calorinc value set up by the Transvaal coal owners as of an "artificial and ruinous" character, and points out the disastrous results of its application to the Transvaal coal industry as a whole. If grading does not follow this "artificial and ruinous" procedure, then it is doubtful whether it will do much to enhance the reputation of South African coals. Coal is not like the mealie. We have to dispose of what Nature has given us and it is beyond the power of the coal owner to do anything but mine it carefully and screen and clean it properly. So long as he does that he should not be handicapped in disposing of it by the setting of an "artificial and ruinous" grading standard based upon the limited product of one or two mines. The summarised statement of the Commission would, in my opinion, find readier acceptance if it were worded: "The grading of coal if carried out so as to have due regard for the average qualities of coal in either Province and so as not to unduly restrict the mining of the coal resources of such Province will enhance the value of South African coal and be of benefit to the industry."

Clause (b).—*One or more grading committees should be established to classify coal into their respective grades, to have an efficient staff for inspecting sampling and determining the value of coals, to issue certificates for coals and to have power to prohibit the export of coal which is dangerous to life or property, owing to its liability to spontaneous ignition.*

Clause (c).—*The cost of grading should be borne by the collieries in proportion to the tonnage shipped by each.*

The elaborate machinery proposed is likely to cost the industry a great deal and could, in my opinion, be much simplified.

Pooling.

Clause (a).—*The present method of handling the Natal shipment of coal at the port is not in the best interests of the collieries, the oversea buyer, the shipowner and the railways and harbours.*

Clause (b).—*A pooling system would result in an improvement, and would be beneficial to the coal industry in several other respects, such as the stabilisation of prices, greater regulation of output, and a greater efficiency of labour at the collieries.*

With these clauses, so far as I am competent to discuss them, I am in general agreement.

Clause (c).—*Any scheme of enforced pooling would be detrimental to the coal industry, but this is not the case with voluntary pooling, which is desirable in the interests of all concerned.*

This clause is incomprehensible, although the full text of the report may make the matter clearer. Either pooling is desirable or it is not. Whether pooling is compulsory or voluntary makes no difference. It is significant and disappointing that in this report grading should be compulsory, but pooling should only be on a voluntary basis. It looks singularly like an attempt on the part of the large coal interests to get the best of this coal business whatever happens. As they possess the best grades of coal, they insist upon compulsory grading, as they cannot control the pooling arrangements, any attempt to compel them to pool is to be depreciated. I should be surprised if the Railway Administration willingly acquieses in this scheme, since from their point of view grading without pooling is useless.

Clause (d).—*When there are adequate facilities available for the off-loading of trucks, and for the storage of coal, the Railway Administration would be justified in levying demurrage on trucks at all ports.*

I agree with this always laying emphasis on the word "available."

Clause (e).—*It is desirable that collieries outside the present Transvaal Coal Owners' Association who undertake shipment business should either be linked up with the present Association or form themselves into a separate association.*

This proposition is not easily understood without the context of the report. I would express the opinion that on general principles this is an improper recommendation to emanate from a public commission. This clause is open to most serious objection for many reasons, and I think it is a matter of regret that it was included. Certainly the most strenuous opposition will be offered to any attempt to coerce collieries into business combines of this kind. Such combinations, if they are to be supported by the Government, must also be controlled by the Government in a number of directions. The formation of a separate association in the Transvaal may, or may not, be possible; the reason for it or its possible usefulness is not obvious unless the Government do not propose to proceed along the lines of this Commission's reports.

Mine Ventilation.—III.

By E. C. RANSON (METALLIFEROUS AND COLLIERY MANAGER'S CERTIFICATES, MINING KING'S MEDALIST).

Underground Fans.

I believe that on quite a few mines on the Reef the main ventilating fan is placed underground. One of the great difficulties with a fan so placed, and an objection always raised against such practice, is its liability to short-circuit after the air has left the fan. With a fan at the end of the circuit, one always has the knowledge that the whole of the air pulled by the fan is finally expelled from the mine. A fan placed in the circuit is not only an exhausting fan, but becomes a blowing or forcing fan too over the latter part of the circuit, and it becomes a very difficult matter indeed (especially in mines with large open inaccessible areas, as we have here) to prevent a fan taking the line of least resistance, by pulling the air back to it, rather than push it to the surface.

When discussing the different depressions of a fan, I mentioned that the inability of a fan to discharge without speed into the atmosphere, destroyed to a certain extent its ability to create depression, or in other words reduced its efficiency. This to a certain extent can be remedied with a fan on the surface by exhausting into an expanding or évasée chimney. What really happens with a fan underground? The air is delivered at a great speed against an excessive resistance, the tendency being to compress the column, throwing an excessive back pressure on the fan, materially reducing its efficiency.

Proper Position of Water Gauge.

This brings me to the proper position of the water gauge on such a fan. The practice with a fan at the end of the circuit is to have one leg open to the inlet side (fan chamber) and the other to the outlet (atmosphere). A water gauge so placed on an underground fan, one leg open to the inlet and the other to the outlet, does not give the effective depression a W.G. producing ventilation, but one which is excessive. With a fan, say, 4,000 feet from the surface, the reading of a W.G. so placed may be as much as twice the correct or actual W.G. producing ventilation. The position is the same as with an underground furnace producing ventilation, and the correct position of the water gauge is to have one leg open to the fan chamber as before, and the other connected to the intake side of the dividing doors at that point.

This is all I propose saying on the theory of ventilation. I think I have made myself clear, and there ought to be little difficulty in following the different points I have made in this very complex subject.

I now want to deal with the practical side of the subject. We can assume that we are getting the maximum efficiency out of our fan; what we want now is to get the air round the various working places and obtain the maximum work out of it.

The thing that strikes one rather forcibly on these mines is the lack of control over the air; very little effort being made to course the air, so as to give the far off places a fair share. It may not be quite so easy to do this as on a colliery, but there is certainly room for great improvement. The first thing to do is to design or lay out well-defined splits or ventilating districts, each split, as far as possible, to have a separate intake and return of its own. Splitting of the air current is always very advantageous, it makes the air throughout the mine purer, and by dividing the main current into a number of parts, the velocity is reduced, enabling a large quantity of air to be produced at a reasonable velocity. When one remembers that the pressure required to overcome friction of an air current varies as the square of the velocity, and the power required as the cube of the velocity, the advantage of splitting will be readily understood.

(To be continued.)

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Tin in South-West Africa.

PROSPECTS OF THE PROTECTORATE EXPLORATION COMPANY'S PROPERTY—REPORT ON THE PAUKWAB OCCURRENCES.

Some few weeks ago we referred to the acquisition of the Paukwab Mountain tin claims situated in the Omaruru-Karibib tin fields of South-West Africa by the Protectorate Exploration Company of East London.

This property was visited and reported on by Mr. Owen Letcher, Assoc.Inst.M. & M., at the beginning of the year. Mr. Letcher inspected the property in his private professional capacity and with the permission of the Directors of the Company we are now able to publish the following extracts from Mr. Letcher's report.

The base metal claims constituting what is known as the Paukwab Tin Mine are situated in the Okombahe Reserve in the Omaruru district of the Protectorate of South-West Africa, in latitude 21 deg. 45° south, longitude 11 deg. 45° east. The main camp at the mine in the Paukwab Mountain is situated 45 miles west of the township of Omaruru and 76 miles north-west of the township of Karibib. Omaruru is on the narrow gauge railway and is 45 miles distant from Usakos, which is the southern terminus of the Usakos-Tsumeb narrow gauge line. The nearest point on the coast to your property is at or near Cape Cross, distant about 80 miles to the West. The nearest point is Swakopmund, distant from Karibib 113 miles and from Usakos 93 miles. Although Omaruru is the nearest town on the railway to the property, Omaruru possesses the disadvantage of being on the narrow gauge railway, and hence any stores destined for Paukwab or any production therefrom would have to be transferred from broad to narrow gauge at Usakos. Usakos is on the broad gauge line, and for this reason is the more advantageous station for your property, but this advantage would disappear if the Usakos-Omaruru section was converted into standard or broad gauge.

Roads.

There are fairly good roads leading to your property from Karibib and Usakos. There is also a road from Omaruru. The distance from Usakos to the mine is about 20 miles shorter than from Karibib to the mine. The wagons cover this distance (about 60 miles) in three days.

The journey from Karibib to Paukwab can be accomplished by car in about nine hours, but there are numerous difficult sand drifts to negotiate.

Your company holds 33 base metal claims extending over an area of approximately eight square miles.

The distance to the main camp on your property from Karibib railway station was determined by clinometer on the outward journey and checked on the return at 76 miles.

The Paukwab tin occurrences were discovered by Otto Ortner before the Anglo-German War.

Ortner and some friends formed a syndicate to exploit the property which was recently acquired by your company in terms of the prospectus.

Topography.

The Paukwab Mountain consists of a range, with its longer axis lying approximately N.N.E. and S.S.W. The extreme length of the hill is about 4½ miles and its extreme breadth about a mile. There is a large depression or nek in the hill at about three-quarters of a mile to the north of the camp.

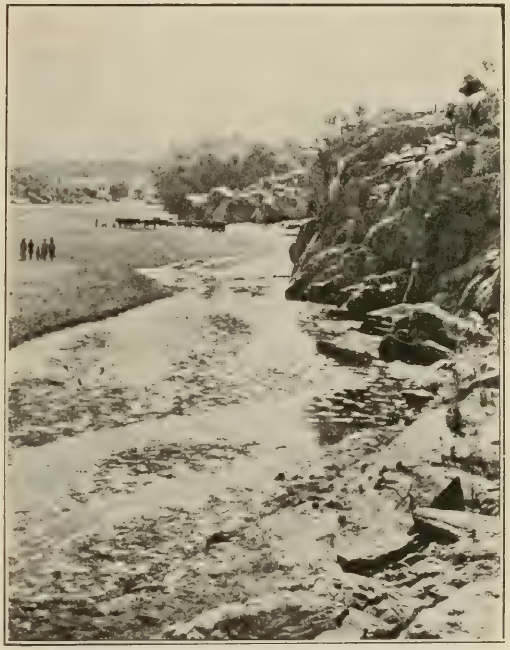
On the eastern side of the mountain the ground slopes away to an extensive flat plain, but on the south-eastern flanks of the mountain there are numerous subsidiary kopjes and rock masses intersected by creeks. On the western side the terrain is much more hilly and consists of innumerable foothills intersected by water courses.

All creeks and water courses were dry at the time of my visit (December 31st, 1920-January 2nd, 1921).

Geological Features of Paukwab.

Along the eastern flank of the Paukwab Mountain and over the greater portion of the length of the Berg are well defined lodes or outcrops of felsite and granite rich in tourmaline and frequently containing visible tetragonal crystals of cassiterite. (Sn. 02.)

These lodes have a general direction of strike into the base of the mountain, the mean bearing of strike being about east and west, but large variations are noticeable at various points.



The Omaruru River at Okombahe, Site of Proposed Storage Dam.

On the western side of the mountain these conditions are more or less duplicated, but on this portion of your property a lesser amount of exploratory work had at the time of my visit been carried out than on the eastern portion.

The characteristics of the western system of occurrences are, however, much the same as those observable in respect of the eastern system.

On the eastern section there are many cross lodes (or caunter lodes, as they are termed in Cornwall) which branch off from and connect with the main bodies striking into the mountain.

Number of Lodes.

The number of lodes which I observed is so great that in the absence of detailed and lengthy survey of each particular body I can only apply the word "innumerable" to them.

Mr. F. F. Fritz, who, I understand, spent a considerable period of time on your property, estimates the number of occurrences at over 400.

During the brief period of my visit I traversed the greater portion of your property, and from my own observations I am inclined to agree with Mr. Fritz's estimate, although I am not prepared to give any estimate as to the probable number of separate occurrences which I saw, nor can I say how many of them contain cassiterite in quantities which should result in profitable working.

I can only deal with the values obtained by sampling at the few points where sufficient work has been done to enable a representative sample to be obtained from below outcrop.

Determination of Values and Main Workings.

The values obtained from sampling are exhibited in paragraph 22 in the certificates furnished by the Standard Bank and attached to this report.

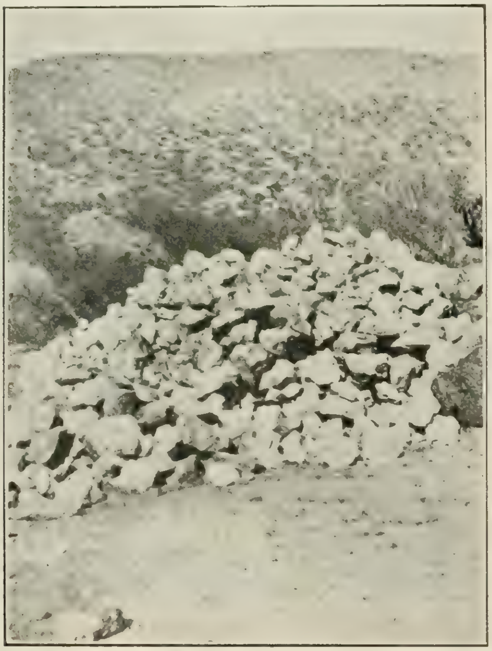
The principal points at which prospecting work has been carried out are situated in the vicinity of the camp (see photo P. 4) and to the south-east thereof.

These workings are hereinafter referred to under the heading of "Main Section Workings," and are as follows:

"B" Workings.

A shallow shaft has been sunk here immediately to the east of the camp.

The lode here was sampled at a depth of between four and five feet over a width of two feet.



A Dump of Felsite Containing Tourmaline and Cassiterite at the "F" Shaft Workings.

The C shaft lies about 180 yards west of this. A sample was taken here at the bottom of the shaft (depth about 30 feet) over a lode width of 2 feet 10 inches.

D shaft is situated about 200 yards south of C and in the vicinity of a well, which encountered water at a depth of about 18 feet.

Close to this a 4 ft. 6 in. rotary pan is at work on the treatment of detrital gravel. (See photos P. 5 and P. 6.) A sample was taken here at the bottom of the working (24 feet) over a lode width of 2 ft. 9 in.

About 500 yards further to the south-east is the "E" cutting. Both walls of the lode had not at the time of my visit been exposed on account of this, and the extreme hardness of the lode; a surface "grab" sample was taken over a width of 3 feet.

At the F workings, situated about 450 yards south of "E," a sample was taken over a width of 17 in., but this does not represent the full width of the lode at this point.

Close to the F workings is a dump of lode stuff (felsite) containing tourmaline and tin, and which exhibits in a striking degree the cleanness of the lode and its freedom from gangue. (See photo P. 8.)

G shaft is distant from F about 400 yards to the south, and a sample here was taken over a width of 5 ft. 9 in. at a depth of 8 ft. 3 in. This occurrence is known as the Ortner lode since Mr. Ortner dollied a considerable quantity of tin bearing rock from this point.

The mean strike of these ore bodies may be taken as 20 deg. west of south.

The H lode is about 750 yards south-west of the G lode and is distant from the main camp not less than 1½ miles. (See photo P. 9.)

The strike is N.W. and S.E.

The sample taken at this point was over a width of 4 ft. 9 in.

The general trend of these ore bodies is towards the south and the dip varies from about 22½ to 40 deg.

North Workings.

The A workings are situated about 1½ miles to the north of the camp. There are a large number of lodes in this vicinity. On one of these a shaft has been sunk to a depth of 14 feet and a sample was taken at this depth, over a lode width of 7 ft. 6 in.

Native Labourers and the 4ft. 6in. Rotary Pan at Paukwab.

East Section.

Passing from the camp over the limestone capped flats which extend from the flanks of the berg, a large number of felsite lodes containing tourmaline and cassiterite are encountered at points where the limestone has been denuded away.

At a distance of about 1½ miles from the camp a network of veins is encountered, and the occurrences here seem to justify the designation of "stockwerks."

A sample was taken from a shaft sunk on one of the lodes of this series at a depth of 10 feet and over a width of 3 feet 6 inches.

The dip of the lode is 25 deg. to the south and the strike roughly east and west. I am informed that a cross-cut to the north from this point has intersected several leaders, but I could not investigate these on account of water being in the bottom of the shaft.

From this point to the northern boundary is about 2,400 metres and to the eastern boundary 1,200 metres.

The course on the lodes here is towards the mountain flanks. I walked from the east lode section, 248 yards west, towards the Berg, and encountered lodes similar to those in the stockwerks series and having the same line of strike. Over the greater portion of the distance limestone obscured the primary formation, but I am of opinion that the lodes on the eastern flank of the mountain are probably correlative to those observed on the plain a mile and a quarter to the east, and are genetically affiliated.

Relationship of Lodes.

Similarly the numerous lodes to be observed on the western side of the Paukwab Berg may on exploitation be found to merge with the occurrences striking into the Berg from the east.

The occurrences on both sides are probably each related genetically to the plutonic complex of the Paukwab Mountain, which is capped by a large diabasic flow and in places (particularly on the western side) is flanked by slates.

The western lodes (see photo P. 3) occur as strong and pronounced outcrops, with an even line of strike into the mountain. Their mineralisation is practcally identical with that of the eastern ore bodies, but very little work had been done on these western occurrences at the time of my visit.

Mineralogical Characters.

The majority of the lodes which I observed may best be termed "felsites." Over large areas mica is entirely absent and the matrix consists of a cryptocrystalline mixture of quartz and felspar.

The term "quartz" contained in the prospectus on pages 2 and 6 is incorrect.

At certain points the mineral bearing bodies contain mica (muscovite and occasionally biotite), and in these areas the lodes are truly granitic.

There are no evidences of any extensive faulting or earth movement on the mountain flanks where the stanniferous bodies occur.

Where the lodes intersect one another as in the eastern stockwerks section, there are frequently small dislocations or "heaves."

Concentration of mineral value is probable at the points of intersection. All the occurrences (other than those of detrital origin) appear to be true fissure veins.

The predominant mineral in these felsite and granitic occurrences is tourmaline.

The remarkable extent to which this mineral occurs, coupled with the widespread belief that in these Congo tin fields tourmaline and cassiterite mutually exclude one another (vide Dr. Wagner's report, paragraph 11 of this report) seems to have predisposed numerous investigations to the belief that the frequency and plenitude of the occurrences of tourmaline preclude the occurrence of tin stone in any profitable quantities.

The observations of cloos, referred to by Wagner, are no doubt true of other mineral occurrences in the Karibib-Omaruru areas, but in view of the valuations secured by me, I am strongly of the opinion that these premises cannot be applied to Paukwab.

In the Levant district of the West of England tourmaline in the form of both granular and acicular crystals is a common accessory mineral of cassiterite and a similar association is to be observed at Paukwab, although at the latter place tourmaline greatly predominates and the presence of tin stone is generally revealed only by careful examination.

Other associated minerals at Paukwab are muscovite, biotite, garnet, flourspar; chlorite, beryl, molybdenite (rare).

Qualitative Analysis of Lode Matter.

I observed no evidence of any mineral detrimental to the simple treatment by concentration of tin stone at Paukwab. This is confirmed by the qualitative analysis made by the Standard Bank on a typical sample. (See annexure.)

It is, of course, impossible to say what other elements may be encountered in depth, but there is certainly no reason at present for thinking that minerals not amenable to the general practice of treating tin ores will be met with.

I am informed that the smelters who have treated such quantities of Paukwab cassiterite as have so far been shipped report most favourably on the quality of your property's produce.

Detrital Deposits.

On both the eastern and western sides of the mountain there occur in the creeks and water courses large quantities of gravel which at many points (and probably for its greater part) contain tin stone.

This gravel is principally of alluvial origin (i.e., resulting from the eroding action of water), but it is probable that much of it results from eluvial agency (i.e., it is wind blown and results from aeolian agency).

The detrital deposits on the eastern side of the mountain gave high grade pannings and are being treated in a 4 ft. 6 in. rotary pan.

I am informed that the output from this pan is about 200 lb. of concentrates per day. Another pan had arrived on the property at the time of my visit, but was not then erected.

I understand that it is the intention of the company to employ this and other pans on the treatment of gravel and good profits should be earned thereby in the preliminary stages of the exploitation of the property.

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Thickness of the gravel appears to vary from two to seven feet.

Rotary pans appear to be economical and effective machines for the treatment of stanniferous gravel where water is scarce and when properly adjusted, but with the Okombahe water scheme in commission, hydraulic giants or monitors might be more profitably employed. This matter, however, requires much further investigation in regard to area and depth of gravel, etc., before any definite recommendations can be advanced.

Western Detrital Deposits.

The creeks on the western side of the mountain also contain large quantities of detrital matter carrying cassiterite.

The slates in the beds of the creeks have here acted as natural riffles, and at many places very rich concentrates are found. The cassiterite fragments are semi-angular and do not appear to have travelled far.

A sample of gravel taken from one of these creeks gave an assay of 2.53 per cent. tin.

Assay Values.

Careful sampling and assay by the Standard Bank, Johannesburg, has determined the following values, which are grouped according to main section, east section, north section and "alluvial."

NATIVE LABOUR.

At present the supply of native labour available appears to be sufficient for the existing needs of the mine. The natives now working there are mostly Berg Damaros (Klip Kaffirs) and Hereros, and as a whole cannot be regarded as very efficient. Present rates of pay are:

Men: £1 to £1 5s. per month and food.

Women: 15s. per month and food.

Power.

I understand from Mr. Aidan D. Wilson that as operations expand and the necessity for some form of power increases, your company has in contemplation the employment of a gas plant at Paukwab. It should be possible to burn sufficient charcoal locally, and for a proposition of this nature, situated as it is at very considerable distance from any coal fields a suction gas plant should give excellent results. As instancing the benefits derived by an outlying proposition from employment of this class of power, I may remark that the Lonely Reef G.M. Co. (Matabeleland) is installing a gas plant and expects thereby to effect a reduction of 10s. per ton in working costs.

MAIN SECTION (Seven Samples).

Place of Sample.	At depth of	Width of lode over which sample was taken.	Assay Value per cent. of metallic tin.	Lbs. of Tin per short ton of 2,000 lbs.
B Shaft	4 to 5 feet. ..	24 ins.	2·16	43·2
C ,, ...	30 feet.	34 ins.	3·22	64·4
D	24 feet.	33 ins.	2·73	54·6
E	Grab sample surface	36 ins.	2·56	51·2
F ,, ...		17 ins.	2·88	57·6
G		69 ins.	5·32	106·4
H		57 ins.	1·26	25·2
NORTH SECTION (One Sample).				
A Shaft	14 feet.	90 ins.	0·43	3·6
EAST SECTION (One Sample).				
E Shaft	10 feet.	42 ins.	0·31	6·2
ALLUVIAL (One Sample).				
Grab sample from Western side of mine			2·53	50·6

The average of the seven samples from the main section is 62.2 lb. tin, or 124.4s. per ton over 38.57 in. of lode matter.

The one sample from the north section gives 8.6 lb. tin, or 17.2s. per ton over 90 in. of lode matter.

The one sample from the east section gives 6.2 lb. tin, or 12.4s. per ton over 42 in. of lode matter.

The one "alluvial" sample from western side of the mountain gives 50.6 lb. tin, or 101.2s. per ton.

This is a remarkably high value for gravel! Concentration of tin stone was observed at the point where sample was taken, and obviously very much lower than this would be profitable.

In the above calculations the ton is taken as the short ton of 2,000 lb., and the value of tin is taken at £200 per short ton, or 2s. per lb.

Stores and Transport.

Wagon transport from Usakos to Paukwab (three days) at present costs 4s. per 100 lb. When return lodes are available the cost will be reduced to 2s. 6d. per 100 lb.

Motor transport could negotiate the distance, but would encounter difficulties in the deep, sandy drifts, of which several have to be crossed. The contours and general nature of the country are such that there should be no great difficulty in constructing a light railway from Usakos to the mine at a moderate cost and in a comparatively short period of time.

Timber.

There is a fair supply of timber to be found on your property and in its vicinity. Most of the trees would, however, only furnish small poles. Larger timber (particularly the anaboom) is to be obtained on the Omaruru River at Okambahe (4½ miles distant from the mine).

Milling Sites.

There are numerous good milling sites adjacent to the lodes existing on the flanks of the mountain. At these sites the forces of gravity would carry the pulp from the battery through the various stages of treatment and would dispose of necessity for installing elevators. A good site or sites could also be selected in proximity to the suggested water storage scheme.

Provision of Water Supply.

The success of a cassiterite producing venture depends in a substantial degree upon the proximity of an ample supply of water. The recovery of SnO_2 from its ores is essentially a wet concentration method, success depending upon the high specific gravity of cassiterite in relation to its enclosing mineral constituents. The arid nature of the greater part of the South-West African Protectorate and the scarcity of water which exists over the larger portion of the Karibib-Omaruru (or Erongo). Tin fields have rendered the adoption of a crude method of dry concentration imperative at most of the propositions working in this area.

This method has also been adopted at your property, and the results secured from it on "alluvial" are satisfactory when the crudeness of the process is taken into account.

But it is obvious that such a primitive method of recovery is not calculated to secure a high percentage of extraction at a low rate of cost, and in any scheme for the extensive working of the Paukwab cassiterite occurrences (and I am of the opinion that the prospects of the property justify preliminary consideration of plans for working on a large scale of output) it is patent that production will have to be considered on the basis of recovery adopted on other tin fields, i.e., preliminary sorting and breaking in crushers, reduction in stamp batteries and stage concentration of the product coming from the mortar boxes.

This entails the use of water, and in this connection your property is most fortunately circumstanced, lying as it does in close proximity to the Omaruru River.

The Omaruru is one of the few perennial streams of the Protectorate, and I am of opinion that by the adoption of a scheme of water conservation an adequate supply of water can be impounded below (i.e., downstream of) the Okombahe Missions, at a point distant about 4½ miles from the existing camp at Paukwab.

Amount of Water Available.

The amount of water which could be impounded in a barrage at Okambahe is very large indeed. At the time of my visit (December 31st to January 2nd, 1921) the width of flowing water at the points marked P11 and P12, situated about 200 yards north of the Okambahe Roman Catholic Mission, is exhibited in photo P12, and there was evidence that quite recently the stretch of water at this point had been 300 yards wide. The whole bed of the river is saturated, and it appears that water may be obtained at any point in this course of the stream at a depth of 12 to 18 inches.

I am informed that the rainfall there is about 12 inches per annum and that the Omaruru River has been in flood for three months in the year for the past five years.

I have had no opportunity of confirming these statements, but it is clear from an inspection of the river beds, its banks, water marks and vegetation that a very large sheet of water has recently covered the Omaruru River channel. About a quarter of a mile below the store and Lutheran Mission at Okombahe the Omaruru River makes a sharp detour to the north-west and then bends around again to the south-west. (See photos P. 13 and P. 14.)

The course of the river here is imprisoned between high, rocky walls, and is about 200 yards wide. A barrage constructed here with walls, say, 50 feet high, would impound over a length along the river course of 200 yards 600 feet x 600 feet x 50 feet—18,000,000 cubic feet—112,500,000 gallons (one hundred and twelve and a half million gallons) of water.

As a temporary measure and before any large scheme of water conservation is undertaken, a sufficient supply could be obtained by digging a sump in the bed of the river at point (P. 11 or P. 12, photo P. 11) and elevation by pumping to point R or thereabouts, from which latter point it would gravitate to the storage dam on the mine at point P. 15 (photo P. 15). I have made no analysis of the water, but believe it to be strongly alkaline in character.

Water is obtained on the property in a well close to the rotary pan, and it is probable that in fairly deep workings on Paukwab large quantities of water will be encountered which will have to be pumped out of these workings.

This water, too, would be available for milling and other purposes.

Recommendations as to Future Policy.

I would recommend that development be pushed on at the main section workings, and that as labour is available prospecting operations should be extended on other portions of your property by costeaning trenches and pits. Meanwhile, continuation of the working of the detrital deposits by means of pans should secure a source of revenue to the company. I would also advise that the water storage projects should be pushed on without delay.

Conclusions.

The broad conclusions I have arrived at in regard to your Paukwab property are summarised as under:—

1. Cassiterite is widely distributed over the claims and occurs both in lodes and in detrital gravels.
2. The assay results obtained from samples taken by me over lode widths, which in one or two instances are probably less than the full width, disclose highly profitable values over a large area extending from the camp to the south-eastern corner of Paukwab Mountain, a distance of at least a mile and a half.
3. The assay results obtained from samples taken by me at the east and north workings disclose the presence of cassiterite in quantities which are below the average cost at which your property could be most economically worked.
4. The indications are that there is a very large quantity of detrital gravel which contains tin in payable quantities.
5. The area of your property is so large and the occurrences of cassiterite are so widely distributed that I regard it as highly probable that numerous other important and profitable discoveries will be made.
6. The occurrences of tin stone observed at the time of my visit are of a nature which presents no difficulties to ordinary methods of treatment and smelting.
7. The facilities for economical working are favourable
8. An ample supply of water can be obtained from the Omaruru River at moderate cost.
9. The property possesses enormous potentialities as a producer of tin, and at numerous points the profitable nature of the deposits has been established over a substantial area.

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Mining in Siberia and the Russian Far East.

MINING MAN'S INTERESTING NARRATIVE OF PERSONAL EXPERIENCES UNDER THE BOLSHEVIST REGIME.

By Dr. L. Heyman.

We are glad to be able to print hereunder an article by Dr. L. Heyman, brother of Dr. A. Heyman, the well-known chemist and metallurgist of Johannesburg. Dr. L. Heyman has just made his way back from Siberia, where he has had a unique opportunity of studying at first hand the mining position there under the present difficult conditions.

For the past four years I have *lived* in Siberia, during which time I was intimately in touch with mining affairs and enjoyed unusual facilities to investigate mining matters in Far East Russia. Bolshevism has seriously handicapped and almost ruined even primitive Russian mining, as it has other forms of endeavour in Russia. Siberia, until recently, was politically fortunate in being least under the sway of Bolshevik rule, and although mining was seriously interfered with and outputs very much reduced, yet mining was carried on to some extent in spite of the political upheaval throughout the country. During my stay in Russia I visited the gold mines of the Ekaterinburg and Maritime districts, the platinum fields of Ekaterinburg, the coal mines of Cherumuchovo and Maritime districts (including the famous Suchan coal mines), and the iron mines of Maritime as well as tin mining in Olovianaya, etc. In this article I propose to deal briefly with gold, silver, lead, zinc, copper and sulphur mining, and at a later date hope to contribute further notes on coal, oil, iron, etc.

Gold Mining.

During the twelfth century gold was first discovered in Russia, in the Urals and the Province of Olonatz. At the time of the commencement of the great European War gold was being mined throughout the entire length of Siberia, a distance of 5,000 miles. The most important of the producing gold mines are: Ufa, the Urenburg, the Perm, the Ackmolinsk, the Semipalatinsk, the Eniesi Tomsk, the Irkutsk, the Transbaikalia, and the Amour, all in the Maritime Province and the Yakutsk, the Kamchatka and the Onadir in the extreme north-east.

The average standard of gold produced in Siberia may be taken as about 840 parts per 1,000 parts fineness. The following statistics show the gold output for Russia for the years mentioned, expressed in tons:

Year.	Ural	Western Siberia.	Eastern Siberia.	Total Tons.
1879 . .	11.3	2.8	33.3	47.4
1910 . . .	11.6	4.3	54.0	69.9
1914	9.7	4.5	59.7	73.9
1917	1.4	0.6	31.7	33.7
1918	4.5	0.4	17.0	21.9
1919	0.6	0.8	11.0	12.4

As will be seen from the above table the gold production of Russia rose rapidly until 1914, when a total of 73.9 tons of gold was produced In 1917 the gold output fell to less than half of the 1914 output, due to some extent to war conditions and more seriously to the internal revolutionary state of the country. From this period onwards the gold output rapidly diminished; in 1919 the output only totalled 12.4 tons, and although official figures are not available for 1920 I understand that the Eastern Siberia total gold won is estimated at about 3 tons, and certainly not greater than 5 tons.

Bolshevism and Mining.

At present there is very little hope of improvement in mining conditions, indeed things are daily growing worse in mining as in other affairs, due to Bolshevik misrule. Until the present misgovernment of Russia is overthrown civil strife must prevail in Siberia. Just previous to my departure the Bolsheviks had attempted to restart the platinum and gold industries in the Urals and Ekaterinburg Provinces, but I have little hope of their success, judging by their past endeavours in industrial undertakings.

What mining attempted by the Bolsheviks has invariably ended in the shutting down of mines, due to incompetent and careless handling of plant and machinery, the absence of organisation, constructive effort, and absolute lack of discipline.

Further, machinery spares are almost unprocurable in the country, and transport is quite inefficient.

Mineral Resources.

The mineral resources of the country are gigantic, and given decent government, I am certain that Far East Russia will quickly become again a great gold producer. Not only are many mines ready to produce, but, as little prospecting work has been done, and that of quite a superficial nature, doubtless many reefs yet remain to be discovered. Remarks on the gold-producing areas of the Priamur region: The gold-producing areas in Priamur or in the Amur mining district consist of (1) the region of the River Urkan and its tributaries; (2) the River Olday; (3) the lower Selemdja; (4) in the Eastern district along the Amur railway line, and (5) in the Hingan area. Most of the gold is alluvial; the Selemdja and Hingan placers, however, are nearly worked out. In 1915 reef gold was discovered on the upper Dyalinda, and there was every prospect of this mine developing very satisfactorily, but for Bolshevik interference in 1918, which has for the present put an end to any development owing to the owner being killed by the Bolsheviks. The mining industry was established also in the Zeid district, the first gold discovery being made in the Guillay River. In the Bureya district gold is also won, but the severe cold and absence of transport do not

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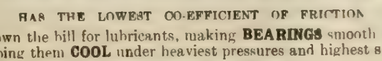

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permit of development. In the Maritime gold is mined on the River Kol, and near the lakes Udil, Orel and Chlid, also in the region of the rivers Kerb and Lower Amur.

Assuri Gold Producers.

On the River Tummin, flowing into the Tartar Straits, and on the Island of Ascold, gold is found in quartz veins. This district has been very little explored, and the placers located rather poor. Gold is found in many parts of the Kamchatka districts, chiefly in the Provinces of Ochotsk, Gijiga and Onadir. Most of the rivers flowing into the Ochotsk Sea have rich gold-bearing deposits. This district impressed me as having a very brilliant mining future. On the Onadir Peninsula there are very rich placers, and this district has attracted considerable attention from American and Canadian miners. The methods employed for gold extraction are in many cases quite primitive; however, such mechanical devices as dredging and hydraulic mining are occasionally employed. The whole of the Priamur region has only seven dredgers, one hydraulic plant and one excavator, totally inadequate for this extensive gold area.

Silver, Lead and Zinc.

These deposits were discovered in 1909. The mines were capitalised and controlled by German interests, the operating company being the Tetuche Co., and are situated in the Tetuche district in the mountain chain of the Southern Sichoto-Alin, close to St. Olga Bay. The zinc ore is not in large quantity, but the lead-silver ore reserves are estimated at two million tons. The ores are galena and sphallerite, and the average analysis of the mined materials is about 15 per cent. lead, 17 per cent. zinc, and 280 grammes silver per ton (9.0 ozs. per ton). The annual output amounted to about 50,000 tons of ore, producing 7,500 tons of metallic lead and 8,500 tons of metallic zinc and 15 tons of silver. No smelting is conducted at the mines, the concentrate, previous to the war, being sent to Germany and Amsterdam, and latterly to Japan. In the same district and near to the Bay of Plastum, discoveries of similar ores have been made, but for the present these are not being worked.

Sulphur. The element has been discovered, also in Tetuche district, but so far no real development work has been done.

Copper.—I know of only one producing copper mine near the Dyiguit Bay, in the Assuri district, Maritime Province. The ore is very low grade, as low as two per cent. copper, being worked naturally on a very small scale.

As I have already mentioned, the future mining development of the country will, in my opinion, prove highly successful, since the gold reserves in Siberia and the Far East are almost unlimited. Up to date very little investigation and prospecting have been carried out, but when Russia becomes normal once more, and the Bolshevik misrule has fizzled out—conceivably by the end of the year—I am certain the gold mining industry will flourish and grow greater than ever to the benefit of my benighted land.

Congo Development.

In the Congo, it is noteworthy that a policy of industrialisation is being pursued. As a first step it was necessary to ensure that the Congo should not become solely colonised by officials as a result of general State intervention. In the last two years most administrative services of an economic nature have been transformed into commercial organisations; for example, the Kilo and Moto gold mines, the Upper Congo water transport service, the cotton spinning factories and the farm at Nyangwe, handed over to the Compagnie Cotonnière Congolaise, the rice domains, which have been transferred to a company, and several plantations and farms. The Mayumbé railway and the Boma printing works will probably shortly be endowed with similar commercial organisations. The State, however, retains an interest in the capital of these concerns.

From the industrial point of view the colony is more than fulfilling expectations, and Katanga is becoming more and more an important mining centre. The production of copper is augmenting considerably. The Union Minière, the company concerned with the exploitation of cupreous deposits, is immobilising 140 million francs for the erection of a concentrator for low-grade ore at Kikasi, and about 65 million francs will be spent by the Katanga Railway (of which the State is the principal shareholder) in order to ensure the regular transport of an estimated traffic of a million tons, consisting of coals, ore and ingots. On the railway improvements being completed, the Union Minière will guarantee the interest and sinking fund. Besides the copper deposits in Katanga, there are deposits of tin, which have only recently begun to be exploited at Busanga

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The conditions of this competition are as under:

1. Essays must not exceed 2,500 words in length, and where new or suggested devices form an essential portion of the Essay, the contribution should be accompanied by diagrams clearly exhibiting the nature and functions of such device or devices.
2. Essays should be typewritten or written in easily legible handwriting on one side of the paper (preferably of foolscap size) only.
3. Each essay must state the full name and address of the author and if the author is an employee of a Mining Company operating in South Africa or has been an employee of such a company, his occupation and position should be stated.
4. Essays and diagrams (if any) must be addressed to the Editor, the *S.A. Mining and Engineering Journal*, Box 963, Johannesburg, and be marked "Competition" in the top left-hand corner of the containing envelope.
5. The competition closes on July 1st, 1921.
6. In the event of the Committee of Adjudication deciding that no essay submitted merits the award of £25, the Committee will have power to withhold the award of such a prize and to give in lieu thereof an amount which they consider proportionate to the value of the best article or articles submitted.
7. It shall be at the option of the Editor of the *S.A. Mining and Engineering Journal* to publish any essay or any portion of any essay submitted and to pay for such essay or portion thereof at the rate of £2 2s. per page according to the measure of pages in the *S.A. Mining and Engineering Journal*.
8. No correspondence can be entered into regarding this competition, and the Editor of the *S.A. Mining and Engineering Journal* will not hold himself responsible for the safe return of any manuscript submitted, but where a stamped and addressed envelope is forwarded with each contribution the Editor will, after adjudication, endeavour to return unsuccessful contributions.
9. A competitor may submit more than one contribution.
10. It is an express condition accepted by and binding upon all competitors that the decision of the Committee of Adjudication as constituted above or of any alternative adjudicators is final and absolute. Submission of manuscript will infer a full understanding of the acquiescence of the competitor in this and other conditions of the competition.
11. Essays may be written in either of the official languages.

Points for Competitors.

There are one or two matters in connection with this essay competition which we would like to bring to the notice of competitors.

In the first place it should be made clear that a good idea will not be debarred from winning the prize offered because the contribution fails from a literary point of view. Neither will brevity be a handicap. On the contrary we shall welcome briefly expressed ideas and suggestions provided that they contain some useful and new idea or some better application of an idea or device which is not new or novel.

A committee of well-known engineers connected with the mining industry has been appointed to adjudicate in conjunction with the Editor of this paper.

Rouxville Diamonds.

With reference to the announcement made in the Press on 24th March last regarding the unsatisfactory results being obtained by the above company, further testing and washing operations have been carried out on the lines indicated in the said announcement, and have resulted in only a small return of diamonds. In view of these poor results, coupled with the low prices being offered for diamonds owing to the present condition of the diamond market, the Board have decided to suspend operations after carrying out some further small testing work. Meanwhile the staff and labour force is being reduced to the smallest possible limits. The diamonds on hand at date weigh approximately 900 carats.

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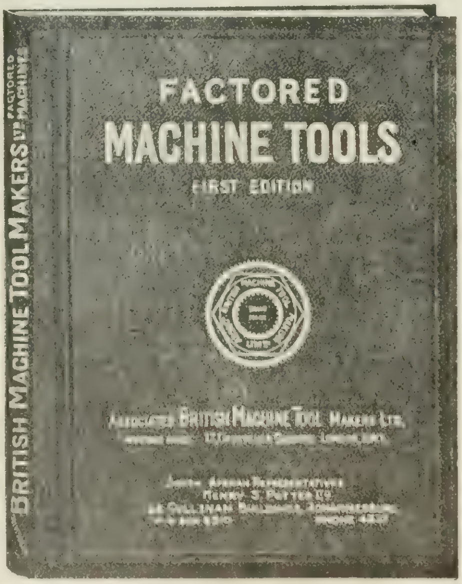
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EDITORIAL.

SOME MINE CHAIRMEN'S SPEECHES.

Meetings of important subsidiaries of the "C.M.S." and Union Corporation groups evoked statements of general interest from the chairmen this week. The Anglo-American Corporation can, of course, hardly be called a subsidiary of the "C.M.S.," though it is closely allied to that well-known and successful organisation. Sir Ernest Oppenheimer, whom we welcome back from a seven months' fruitful trip to the States, presided at the Anglo-American meeting, and in the course of his long and important speech—reported elsewhere in this issue—made some notable pronouncements regarding the diamond and coal industries. His diagnosis of the slump in the diamond market—which he described as the worst the trade has ever had to face!—provides a first-hand and authoritative review of causes and conditions; and was, happily, rounded off with an expression of confidence in an early revival in the trade. As a result of Sir Ernest's visit to the States he was able to announce that steps were being taken "to introduce our shares on the New York market." In regard to coal, Sir Ernest declared that the board, "having formed the opinion that the coal industry in South Africa offers great possibility for successful business, were fortunate enough to acquire options over a number of coal farms favourably situated in the Bethal and Middelburg districts." Excellent analyses of these coals have been received and a new separate company has been floated to deal with this branch of the business. Needless to say, the entry of so influential a group into the coal industry of the Province is to be cordially welcomed, and we can only hope that its influence will be successfully exercised with the Government to obtain the railway extensions necessary to develop the coal industry. Mr. F. R. Lynch presided at the meetings of the "C.M.S." subsidiaries held during the week, and restricted his remarks mainly to reviewing the conditions at the several flourishing Far East Rand Mines of the group. Reports of the speeches at the meetings of the Springs, Brakpan, and West Springs companies will be found in this issue, and provide most encouraging reading in these days of gloom. At one meeting only, that of the Brakpan Company, did Mr. Lynch allow himself to indulge in generalities, and even then his opinons were expressed with his customary caution. "Last year," he said, "we had to face several adverse factors, such as increased wages and higher prices for stores, these being no doubt due to the increase in the cost of living which has been experienced in all parts of the world. The cost of living has shown a considerable drop since the end of the year, and a reduction in the price of stores is in evidence. In due time, wages, which increased with the cost of living, must therefore be reduced, and necessarily so if this industry is to thrive, because present indications are that our gold will not again reach the high-water mark of February, 1920,—namely, £6 7s. 6d.—and it is doubtful whether even the November, 1920, price of £6 will again be reached. Under the circumstances, therefore, lower wages, cheaper stores and greater efficiency will have to come into being, otherwise many mines on these fields will cease operations. Given these factors, and a freedom from industrial disputes, I see no justification for pessimism." There is, it will be noted, a big qualifying "it" in Mr. Lynch's confidence regarding the immediate future of the industry, and we can only hope that his faith in the goodwill and commonsense of the men concerned will prove justified. At the meetings of the Union Corporation group, Mr. M. McCormack, the new Chairman, presided, and prefaced his speeches with a graceful reference to his predecessor, Mr. H. Newhouse. At the Geduld meeting Mr. McCormack confined his remarks to a very clear and most encouraging description of conditions at the mine, but at the Modder Deep meeting he gave expression to some important views on the general mining situation that are of significance at this juncture. "It is difficult," he said, "perhaps unwise, to forecast the course of affairs during the remaining period of the year, but it is possible that the price of gold will rise during the second half of the year, while working costs should not increase and may show some decrease. The gold premium, however, will eventually disappear; the process may be gradual, but it is inevitable. Many measures have been suggested for preventing the closing down of low-grade mines, but, in my opinion, the most important and also the simplest of these are higher efficiency and greater economy all round. It is merely a commonplace to say that a large part of the capital of the world was dissipated on land and sea during the late War, and that this has produced the chaotic state to which the world's economic system has been brought. Broadly speaking, that lost capital must be restored before the pre-War economic conditions can again prevail. The process of reconstruction and financial reformation must necessarily be slow, but these can certainly be hastened considerably if everyone will work harder, produce more, and, at the same time, spend as little as possible. These economic principles apply not only to individuals of every class and grade of society, but also to Governments, national, provincial and local, and every other kind of spending authority. They are, I think, especially applicable to the Rand gold mining industry under its present conditions, and it seems to me that, if whole-heartedly and universally adopted, the lives of the poorer mines will be greatly prolonged to the benefit of everyone connected with them." The whole philosophy of successful industry under to-day's conditions is, of course, summed up in these few words, and we greatly doubt if the message could be made more effective by any extension or refinement of the reasons given

MORE VIEWS ON THE COAL REPORT.

We are able this week to supplement the interesting views of Messrs. Julius Jeppe, Gordon Sandilands, and S. C. Black, published in our last issue on the Coal Commission's report by a further batch of opinions from well-known mining men. Sir Harry Ross Skinner writes: "Generally speaking, I think the recommendations are quite satisfactory, more particularly in respect of those appearing under the headings of 'Grading' and 'Spontaneous Combustion.' It is naturally our desire to build up a large export trade, and in order to do this we must make sure of selling a good uniform grade of coal. If the recommendations of the Commission became law, I feel convinced that we shall have taken a good step forward towards obtaining the object we have in view."

Mr. William Pott, Chairman of the Tweefontein United Collieries, Ltd., writes: "Without having the full text of the Coal Commission's report it is somewhat hazardous to express an opinion upon it, but so far as the synopsis of conclusions made public is a guide I have no hesitation in saying that a very difficult question, involving many conflicting interests, has been dealt with in a masterly way. The grading scheme seems to me the only possible means of attaining the required position without heartburnings or injustice. The right conceded to the railway in respect of their coal requirements is devised to meet their need without imposing too heavy a penalty upon any one or two collieries who have in the past borne the bulk of the low-priced trade to the advantage of outside collieries who could thus cater for higher priced only."

Mr. E. G. Izod, the Managing Director of the Rand Mines, Ltd., prefers to reserve comment until the full report of the Commission is available. No summary can, of course, do justice to questions of the complexity of those covered by the report, and Mr. Izod, who has given much time and thought to the study of the subject, is, doubtless, well advised to refrain from expressing his views at this juncture. A well-known figure in the coal trade, however, who wishes to remain anonymous, varies the chorus of praise bestowed on the Coal Report by giving voice to some very plain-spoken criticism of its recommendations. We print that criticism in full in another part of this issue as an interesting and closely-reasoned statement of the case against the findings of the Commission. It seems to be generally agreed that the Government will not find time this session to deal with the Bill drafted to give effect to the report. In that case, there will, of course, be ample time to study and discuss the complete report before the Bill comes before Parliament during the next session. In the meanwhile it goes without saying that every possible step must be taken by both the railways and the harbours to meet the present opportunity in the coal export trade and to realise the well-founded confidence in the growth of a great export trade for South Africa. The authorities at Delagoa Bay particularly must be encouraged to co-operate with the Transvaal in rising to the occasion. Though the recent breakdown could in no way be prevented it must be remembered that with a coal-loading plant, as with the machinery of a mine, breakdowns simply must not occur. Even when the splendid new coaling installation now under construction for Delagoa Bay is in active operation, it may be necessary to go further and make provision against any danger of delay due to its being "hung up" by providing a duplicate plant as a "stand by." This may seem looking too far ahead, but our view is based upon our confidence in the future of the Eastern port and in its ability to ensure the maximum development of the export coal trade of the Transvaal

DE BEERS DEBENTURES.

De Beers announce that they are selling off surplus stores to the value of a quarter of a million and making an issue of debentures. It requires no great perspicacity to deduce that the explanation is that De Beers want ready money. The offer of surplus stores comes, of course, at a most inopportune moment for the merchants, who, however, appreciate the courtesy of De Beers in offering them the "first refusal" of the stores. After all, it is only business to dispose of surplus stores when a mine closes down at a time like this. Prices are falling, and the stores disposed of to-day doubtless will be replaced more cheaply at the later date when the mine may restart operations. Besides there is always the question of interest on the capital locked up in such stores to be taken into account. The procedure adopted by De Beers in this respect is merely the usual one, and we have an example at our doors this week in the case of the Daggafontein, which is following the same course for the very cogent reasons detailed in the chairman's speech. The issue of debentures by De Beers, the first news of which reached us via the London cables, is not quite so easily explained. The fact is, however, that with no revenue coming in De Beers finds itself under the necessity of borrowing money in the form of debentures in order to meet its current commitments. It may be remembered that De Beers is under the obligation of providing £800,000 annual interest on its preference shares. It has also to "take care of" its existing debenture issue, and it has besides innumerable continuous expenses to meet out of a non-existent income from diamonds. Of course, the new debenture issue is guaranteed, and doubtless the recent visit to this country of several of the leading people in the diamond world was directly connected with this transaction. With De Beers mines now practically at a standstill, and the South-West Protectorate fields also temporarily idle, the Premier by reason, perhaps, of its exceptionally strong cash position, is alone carrying on operations, though also on a very restricted scale. The outcome of the diamond conference at Capetown recently, which means so much for De Beers and the other big producers may be put on record here. The question of continuing the existing agreement was not discussed at the conference, as the agreement did not expire until December 31, 1924, unless twelve months' notice of termination were given meanwhile. The producers agreed as from April 1, 1921, until the Syndicate's stock of diamonds purchased from the four conference producers had been reduced to £3,500,000 calculated at London landed cost, that the following provisions as to the amount of replacements of diamonds by the Syndicate in any one quarter should be substituted for those contained in the main sales agreements between the Syndicate and the several conference producers, namely: (a) When the sales by the Syndicate did not exceed £1,250,000 in any one quarter the replacements to be made by the Syndicate should be reduced to 70 per cent. of the amount it would have to replace under the said agreements. (b) When the sales by the Syndicate did exceed £1,250,000 in any one quarter then, in addition to the replacement under (a) the replacement in respect of such excess should be made by the Syndicate as provided for in the said agreements. The simple explanation of all this is, of course, that the interests of the selling Syndicate and of the producing companies are now identical, and that since no one knows when or how soon the slump in the market for the stones may come to an end it is to the interest of all that production should be restricted. During the period of stagnation, however, De Beers, unlike the smaller producers, has big current liabilities to meet, and for that reason finds it necessary to realise its surplus stores and to raise ready money by means of a guaranteed issue of debentures.

NEW PULIC LOAN ISSUES.

It would be difficult to choose a worse moment than the present for appealing to the public for money. Yet the week has brought forth announcements regarding several new issues. With De Beers debentures we deal in another article, and the Union Government evidently considers that if De Beers can raise money under to-day's conditions the Government can profit by the good example and follow it into the money market. The only thing that seems certain about the forthcoming Union Loan is that its issue has actually been decided upon It also appears that the loan will be both internal and external—i.e., placed in London and in South Africa—but the terms of issue remain undisclosed. That the rate will have necessarily to mark an advance on the rate paid on the last Union loan goes without saying.

in view of the ever-rising rates being paid on public issues in the London market. As much as 7 per cent. was paid by the Indian Government on its loan of 7½ millions in mail week, and this despite the reduction in the bank rate that took place simultaneously. Apparently a clause in the terms of the last Union loan makes applicable to it whatever increased rate of interest is carried by the new issue. The S.A. Reserve Bank is appealing this week for £700,000, and it is stipulated that no more than 6 per cent. can be paid as dividend while gold remains at a premium. Moreover, the maximum dividend payable even when monetary conditions return to the so-called normal is only 10 per cent., so that the issue seems none too attractive in point of interest return in these days of high rates. The prospectus of the new bank does not state whether the issue is underwritten or not; and there is a real danger that the terms offered may not prove sufficiently attractive to the South African public to ensure the flotation of the undertaking. In that event doubtless the Government and the banks may take up the unsubscribed balance. In the sphere of municipal finance we are glad to note that the Johannesburg Municipality has wisely decided to abandon its intention of raising a further loan at this juncture. It is an open secret that the recent Rand Water Board loan of 1¼ millions issued on extremely favourable terms and backed by the best possible security was not fully subscribed, though the list, of course, is not finally closed yet. But there can be no gainsaying the fact that the moment is unpropitious for the issue of new loans. Mining companies like Daggafontein have had to bow to this inexorable fact; and public bodies, whether Governments or Municipalities, would be well advised to stay their hands a little in entering upon fresh commitments, or if they must go into the market, they must be prepared to offer unusually generous and attractive terms if they are to make their appeals acceptable.

Notes & News.

Gold, Wages, and the E.R.P.M. Crisis.

The week has been a momentous one for the gold mining industry. The latest cable from London, dated last Tuesday, shows that gold has dropped to 102s. 11d. per oz. As a sequel, it is announced that the Chamber of Mines and the men's unions are to meet to discuss a reduction in wages, if the mines now on the margin of payability are to be kept working. The vital necessity of cut in wages and working costs generally is shown by the report of the Committee of Inquiry appointed by the Government to go into the question of the E.R.P.M. closing down. The majority and minority reports of that Committee appeared in full in the "Star" on Thursday, and they only too plainly confirm all that has been said and written about the E.R.P.M., its neighbours, and the poorer mines of the Rand in general. We can only hope that the report will galvanise the Government, the Labour unions, and all concerned into action before it is too late!

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Our Second Special Coal Number.

Our Second Special Coal Number is making excellent progress and every effort is being made to ensure its issue by the end of next month. The coal industry, the railways, and the harbours have extended generous support to the undertaking, and everything points to its beating in value and comprehensiveness our first Coal Number, to the supreme excellence of which so many unsolicited testimonials were paid.

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S.A. Engineers' Directory.

The 1921-22 edition of the "S.A. Engineers' Electrical and Allied Trades Directory" is now nearly out of the printers' hands, and will be published in the course of the next few weeks. The work has thoroughly proved its usefulness, and the advance orders for the new edition emanate from all over the Union, from outside mines and from far corners of Rhodesia, the coal fields, and even from South-West Africa. The mines, the railways, and the municipalities have become permanent subscribers to the work, and seldom has a publication evoked so many spontaneous tributes, from the most influential quarters, to its increasing usefulness. Not only is it a comprehensive directory of the engineering and allied trades; but it is also a complete directory of the mines, an automobile and constructional trades directory, and an invaluable "buyers' guide" to the manifold requirements of the trades and industries which it covers. The work is published at 30s. and orders may be sent to this office.

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Consolidated Diamonds.

The Consolidated Diamond Mines of South-West Africa, Ltd., has closed down for the time being in view of the state of the diamond market.

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Held Over.

Owing to pressure on our space this week we are compelled to hold over several important articles, as well as full reports of the proceedings at the Rose Deep and Durban Roodepoort Deep annual meetings.

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Another Gold Discovery.

It is reported that a rich gold belt in the Gwari district, Nigeria, has been discovered, yielding in the mortar 4 or 5 oz. to the ton. Claims extending for 25 square miles in the new gold belt have been pegged by a huge company interested in tin.

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A New Transvaal Coal Field.

We are informed that one of the big Rand houses has acquired a large promising coal-bearing property in the Louis Trichardt listrict. The calorific value of the coal is said to be 13.5, making very little ash, and with only traces of sulphur. The coal outcrop is said to extend a distance of 60 miles and to be split up into three distinct, workable seams. The property is situated some forty miles from the Selati railway with which it is proposed to link it up. This will render access to Delgoa Bay easy.

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Royal Dutch and African Oil.

We understand that the details of the African Oil Corporation's agreements with the Royal Dutch Company are: The Royal Dutch Company takes over management forthwith, with a 12 months' option, and it exercised, a new company is to be formed, with an initial working capital of £500,000. The African Corporation is to get 400,000 shares, which will be of 10s. each, and the Directors have secured the right for shareholders to subscribe for 500.000 at par.

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Mining as a Career for Ex-Army Men.

The Army to-day considers it its duty to the men to train or fit them for their post-service careers. Particular attention is being paid to turning them into good citizens and good workmen. Owing to the presence in the Army of to-day of officers acquainted with practical mining conditions on the Rand the opportunities offering by this field are not being lost sight of. We understand that some battalions contemplate initiating an elementary course of mining instruction for men of good physique and character. As an experiment it is suggested to endeavour to place about half a score of men a year, and should the experiment be successful and labour conditions allow, the scheme obviously offers considerable possibilities of expansion.

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The late Mr. John McCracken.

It is with sincere regret that we have to record the death, early this week, of Mr. John McCracken, a director of Messrs. Fraser & Chalmers (S.A.) Ltd., and one of the best-known and most popular figures in mining and business circles on the Rand. The late Mr. McCracken was connected with Messrs. Fraser & Chalmers for many years, and his business brought him in contact with all the leading men in the mining and engineering world of South Africa. Of a most genial and unassuming personality, the late Mr. McCracken will be deeply regretted by a wide circle of friends both in this country and overseas

THE BUSY MAN'S PAGE.

AN ABSTRACT OF CURRENT INFORMATION FOR MINING MEN, ENGINEERS AND INVESTORS.

FORTHCOMING MEETINGS.

A Company Diary.

Village Deep.—Twenty-first ordinary general; May 25.

Geldenhuis Deep.—Twenty-sixth ordinary general; May 25.

Crown Mines.—Twenty-fifth ordinary general; May 26.

Modderfontein B.—Twelfth ordinary general; May 26.

City Deep.—Twentieth ordinary general; May 27.

Robinson.—Thirty-first ordinary general; May 27.

New Primrose.—Annual ordinary general; May 26.

New Unified Main Reef.—Twenty-third ordinary general; May 26.

Langlaagte Estate.—Thirtieth ordinary general; May 26.

Randfontein Central.—Fourteenth ordinary general; May 26.

Randfontein Estates.—Twenty-eighth ordinary general; May 26.

Consolidated Langlaagte.—Eighteenth ordinary general meeting; May 27.

Witwatersrand.—Annual general meeting; May 27.

New State Areas.—Fourth ordinary general meeting, May 27.

Van Ryn Deep.—Sixteenth ordinary general meeting, May 27.

Government Gold Mining Areas.—Eleventh ordinary general meeting; May 27.

New Kleinfontein Co., Ltd.—25th ordinary general meeting, 27th May.

Bantjes.—Twenty-fourth ordinary general; Corner House; May 27.

Union Corporation, Ltd.—Ordinary general meeting; 94 Main Street; June 3, 11 a.m.

Transvaal Consolidated Land and Exploration Co.—26th ordinary general; Corner House; June 15.

Rand Mines.—Corner House; June 2

What to Read in the Technical Press.

A DIGEST OF CURRENT LITERATURE.

Mining and Metallurgy.

Deep Mining Problems.—Colliery Guardian, April 22, p 1164.

Surface Subsidence.—Iron and Coal Trades Review, April 22, p. 557.

Post-War Conditions in the Metallurgical Industries.—Iron and Coal Trades Review, April 22, p. 571.

Coal.

Stone Dusting.—Colliery Guardian, April 22, p. 1163.

Education and Coal Mining.—Colliery Guardian, April 22, p. 1166.

Iron and Steel.

Electric Furnace Practice.—M. & S. Press, April 16, p. 535.

The French Steel Industry.—The Engineer, April 22, p. 435.

Manganese as a Desulphuriser.—Iron and Coal Trades Review, April 22, p. 559.

Molybdenum Steels.—Iron and Coal Trades Review, April 22, p. 568.

Engineering.

Electric Trucks and Industrial Locomotives.—The Engineer, April 22, p. 424.

Railway Tyre Fixing Machine.—The Engineer, April 22, p. 441.

Gas Engines for Power Purposes.—Colliery Guardian, April 22, p. 1176.

Developments in Turbine Practice.—Electrical Review, April 22, p. 631.

Economics.

K. Eilers v. Guggenheims.—Mining and Scientific Press, April 16, p. 517.

The Zinc Industry.—Mining and Scientific Press, April 16, p. 519.

Work and Monotony.—The Engineer, April 22, p. 435.

The Economics of Pooling.—Colliery Guardian, April 22, p. 1167.

Industrial Welfare.—Colliery Guardian, April 22, p. 1179.

The International Financial Situation.—Iron and Coal Trades Review, April 22, p. 567

Chemical, Metallurgical and Mining Society.

The next monthly meeting of the Chemical Metallurgical and Mining Society of South Africa will be held this (Saturday) evening at 7.45.

London Metal Market.

According to the cables sent from London before the Whitsun holidays, metals during the week have been firm despite the condition of industries, especially copper, in which American interests dominate the position. The rise has caused some business in refined copper by consumers, both here and on the Continent.

Tin made a sharp recovery due to an advance in prices in the East and the improved political outlook. The expectation of a demand from Germany and America proved disappointing. The chairman of the Federated Malay Chamber of Mines has stated that about £240 represent the cost of production per ton.

Lead, after considerable excitement and a spectacular rise, collapsed on profit taking. There was a large turnover, mostly speculative. The short account appears to be practically closed and the opinion is held that the market will recede further.

In spelter speculators are showing more interest, but the position of producers and consumers is unaltered.

In silver the tendency is very uncertain. The restriction on coal and the Reparations Act are both having a restricting influence on supulies. The Indian demand is quieter. To-day's price is 33⅞d. per ounce.

Senhor de Vasconcellos, the Senator representing Mozambique in the Portuguese Parliament, is on a visit to Delagoa Bay.

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The new Governor-General of the Belgian Congo, M. Maurice Lippens, and staff, have been visiting Kimberley, Johannesburg, Pretoria and Bulawayo on their way to Elisabethville. M. Maurice Lippens is accompanied by M. Olyff, the Director of Colonies of Belgium, Count de Pret and Commandant Sohter as aides-de-camp, and by his private secretary, M. Decock. His Excellency was entertained during the week by the Mayor of Johannesburg and the Acting Consul-General for Belgium

ENGINEERING SECTION.

The Proposed Electric Power Undertakings Bill.

IMPORTANT JOINT STATEMENT BY THE S.A. INSTITUTION OF ENGINEERS AND S.A. INSTITUTE OF ELECTRICAL ENGINEERS.

The following important statement submitted jointly on behalf of the South African Institution of Engineers and South African Institute of Electrical Engineers sets out the views of those bodies on the proposed bill to deal with electrical power undertakings in the Union. Prof. Dobson was chairman of the Sub-Committee that drafted the statement.

The comments given below set out the views of the Council of the Institution of Engineers and the Council of the Institute of Electrical Engineers. The object of both institutions are very similar in so far as power undertakings and electricity supply are concerned, furthermore, a considerable number of engineers are members of both bodies. The respective Councils desire to express their gratification at the opportunity that has been afforded them of making themselves acquainted with the Draft Bill, a measure which they welcome in principle and which they regard as being of great importance to the general industrial and economic progress of the Union, and they desire to place on record their opinion that legislation in accordance with the terms of reference to the Drafting Committee is urgently required. Consequently the detailed provisions of the Draft Bill should receive the fullest possible consideration by all interests concerned.

Time Too Short.

It is regretted that owing to the limited time available the Councils have not been able to give the detailed consideration to all the sections, which the importance of the Bill might warrant, and it is hoped that a further opportunity will be afforded for more detailed criticism if thought necessary, or to give evidence in reference thereto when the Bill is before the Select Committee of the House.

Referring now to the consideration of the Drafting Committee's letter addressed to the Right Honorable the Minister of Mines and Industries, dated 4th March, 1921, it is noted that the instructions to the Committee were generally to follow the recommendations made by Messrs. Merz & McLellan, in their report to the Prime Minister, and to draft the Bill on the lines of the Electricity (Supply) Act, 1919 (Great Britain) with modifications to suit South African conditions. The Drafting Committee report that they have found it impracticable to carry out these suggestions owing to the fact that the British Act is largely a Statute intended to co-ordinate and regularise the supply of electricity, which was, and still is, being carried out under the authority of a number of Acts of Parliament. The Councils agree that essential differences in conditions exist; but it would appear that more material departures have been made than are in their opinion justified by the difference in the circumstances of the case. In particular the Councils would refer to the constitution of the Board of Electricity Commissioners as provided for in Section 1 of the Draft Bill. The Councils are strongly of the opinion that the constitution of the Board of the Electricity Commissioners should follow as closely as possible that of the English Act. Section 1 of the Draft Bill lays down that two of the members of the Board shall be or shall become officers of the Public or Railway Service. The Councils consider that the personnel of the Board should consist of three members, two to be nominated by the Governor-General and to be independent engineers of high standing and with business experience, including that of electricity supply and in no way connected with the Railway or Public Service, one of whom should be appointed Chairman, and that the third member of the Board might be selected for his executive and administrative experience and nominated by the Government.

Independence of the Board.

The Councils are also of the opinion that it should be made perfectly clear in the Bill that the Board shall be independent of any Government Department, as unless this is provided for, it might be difficult for it to act impartially as between the Government, the municipalities and private interests when the matters of generating stations and power undertakings are being considered for the supply of the Government Railways or of industrial areas. The Councils consider that the number of Commissioners should be limited to three, without the power to add to their number, as being, in their opinion, sufficient to administer the Act in the Union. They are further of the opinion that the Commissioners should be irremovable excepting by the Governor-General in Council. In the process of administering the Act the Commissioners will be in almost constant negotiation involving the municipalities, private interests, and the Railway Administration, and in order to ensure absolute impartiality in the administration of the Act, the Commissioners should be entirely independent of the influence of Government Departments.

A further most important departure from the British Act is that it is proposed in the Draft Bill almost entirely to exclude Government and South African Railway power undertakings from the control of the Board. The Councils feel that this is not only unfair to private enterprise, but is against the best interests of the country and its economic progress. Presumably the Board, if constituted as suggested by the Councils, should be able to serve the same useful purpose in controlling Government electricity supply as it is hoped they will in the case of municipal and private power supply.

With regard to the matter of the period of licences and of the period of expropriation, the Councils consider that the 25 years mentioned in the Draft Bill is too short. In the Drafting Committee's report to the Minister it is remarked that the views of the members differed considerably and that 25 years represents a compromise. The Councils are of opinion that the Transvaal Power Act, 1910, prescribing a period of 35 years should be followed. It is common knowledge that the capital cost of establishing power undertakings is now much higher than it was when the Transvaal Power Act was put into effect and that consequently longer periods for repayment of capital are now required unless substantially higher prices are to be charged for power.

The above remarks embody the broad criticisms of the Councils on the Draft Bill, and in forwarding these with the more detailed suggestions relating to the principal clauses which are attached hereto, the Councils trust that the Bill, modified in the above respects and as hereinafter suggested, may become law. The above criticisms and suggestions and those which follow are put forward solely with a view to helping to frame an Act that will be in the interests of all electricity undertakings, whether Government, municipal or private, and for the benefit of industry in general.

Professor Dobson's View.

Prof. Dobson said that the Draft Act was a bold step forward on the part of the Government to place electric power supply in the Union of South Africa on a sound footing. It is easy to criticise a Bill when it is in "draft form" because of the many interests involved. But the Drafting Committee, on instructions of the Minister, has afforded opportunities for all interested parties to criticise the Bill and, in general, to enlist their assistance in the framing of an Act which would meet all the circumstances associated with stations operating under the Government, under the municipalities, and private enterprise. As regards municipalities one feels that great consideration has been and will be given to their interests, and your Council sincerely congratulates the Government on its forward movement, and hopes that it will find means in redrafting the Bill to meet such objections as have been raised, so that the interests of the community in general will be advanced and electric power produced in the most economical manner possible which, in turn, will assist the industries of South Africa and the electrification of Railways. Your Council hopes that the development foreshadowed in the Bill will be an accomplished fact at some future date when we shall see sections of the Railways electrified thus running on the most economical lines; the linking up of power stations to take advantage of all diversified loads; and, in general, that it will mean advancement in the interests of the electric industry in South Africa.

Letters to the Editor.

MAIN REEF OR BLACK REEF?

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—It is unfortunate that the Government geologists do not come out of their shells more than they do, and let the mining community of Johannesburg see more of them in the way of lectures and what not, instead of being isolated in the more or less unauriferous Pretoria valley, on the top of the beds of the "Lydenburg Age," which they designate "Pretoria beds," and in theory connect, in some absurd fashion, with "our Gats Rand," which are really the top beds of the "Black Reef geological age," of a thickness of five miles, which is ignored altogether in their survey reports. Until this age is given a separate existence, I reckon that all the money spent on the Geological Survey has been wasted, and its conclusions useless to the rising generation and the world generally. They insist, for instance, that the Randfontein series, with its five or more payable banket reefs, is an extension of the Main Reef series of the Witwatersrand age; whilst I, with 35 years' experience, insist that it is of the Black Reef age, standing vertical. On the Far East Rand the same series of reefs is lying practically flat, and is passed through in every deep level shaft out there, in search of Black Reef, which they term "Black Reef Leader." Why? I have just turned up a section of the Daggafontein bore hole, on which the company's shaft was sunk to over 5,000 feet, and passed this precious thing at 3,575 feet without noticing it. Still, to me this is a perfect section of Black Reef series. Why? Because it has 500 feet of shale below it, and its quartzites and reefs above, with dolomites above them again. Daggafontein thinks it is down on to the Nigel or Van Ryn series—I don't! for there is such a series as the Blue Sky, or Molyneux, which must come first in order of bedding, etc., etc., and there is not room for both, in my opinion. To leave out the Black Reef age in the geology of South Africa is leaving out thousands of square miles of the most highly auriferous age we have, and of which we should be extremely proud, as it is one of the three which no other part of the world has, and alone could account for more gold than the Rand has produced up to the present, and is ever likely to.

I am, etc.,
SCOTT ALEXANDER,
Rand Statigraphist.

Johannesburg,
May 18, 1921.

CAST IRON vs. CONCRETE PIPES.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—Our attention has been called to a letter on page 842 of your issue of March 19th, which is likely if uncorrected, to cause a very wrong impression in the minds of your readers. The letter deals with the comparative efficiency of cast-iron pipes and reinforced concrete pipes, and your correspondent states: Firstly, that the article in the *Birch Quarterly* is advertising matter, and he, secondly, implies that we have published such advertising matter because we are exporters of cast iron pipes. In actual fact, we are exporters of all kinds of pipes, not specially cast iron, and we enclose for your perusal a copy of the *Birch Quarterly* in question, from which you will see that there is no advertising matter in this magazine, and the article to which your correspondent refers happens to be written by an independent engineer of repute and is absolutely unbiassed. We would be glad if you would publish this letter in an early issue of your journal, and thanking you in anticipation.—Yours, etc.,

JOHN BIRCH & CO., LTD.,
ARTHUR HOARE, Managing Director.

London,
28th April, 1921.

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A Fully-qualified Engineer, A.M.I.C.E., requires Position. Specialty: Economic working and system for monthly cost statement. Remuneration: Salary or bonus.
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TO DOCTORS & BUSINESS GENTLEMEN.
For Sale: Brand New 5-Seater Gregoire Motor Car. The production of France and made like a gun. This Car is beautifully finished and complete with the very latest improvements. Genuine Leather upholstering. Can be seen and tried by appointment. The price is right.—Apply "Motor Car," care of "S.A. Mining and Engineering Journal," Box 963, Johannesburg.

The Week in the Sharemarket.

A QUIET WEEK—EASIER TENDENCY ON THURSDAY—AWAITING NEWS FROM EUROPE.

The continuance of the coal strike, the strained Anglo-French relations, and the depressing statement made by the Minister of Finance on Wednesday were not calculated to make markets livelier. The contemplated issue of a new Union Loan, despite the high rates ruling for money, will not help matters, and the public offer of the South African Reserve Bank has not been too favourably received. On the other hand, the speeches made by Rand mining company chairmen during the week were all couched in encouraging terms, and the effect was to strengthen the quotations for several gold mining shares on Thursday, despite a general tone of weakness in the market. Gedulds, Modder Deeps, Brakpans and State Mines were in some demand at firmer quotations, and there can be no doubt that were general conditions more favourable all these favourites would come into greater prominence. The dividend-declaration season is now only a few weeks off, and all the chairmen who spoke during the week seem to anticipate that distributions will be equal to those of this time last year. Diamonds are a little firmer on the more hopeful feeling engendered by Sir Ernest Oppenheim's speech at the Anglo-American meeting, but no one knows when the hoped for revival in the trade may be expected. An improvement in the price of all base metals is bound to follow the resumption of trade with Germany, and from this our silver-lead, tin and copper mines should benefit. No great amount of business is, however, being done, and many of the following quotations for the week are only nominal.

	Fri. 13th.	Sat. 14th.	Mon. 16th.	Tues 17th.	Wed. 18th.	Thurs 19th.
Anglo-Am. Corp. . .	20 0	19 9	19 0*	19 3	19 6	19 4½
Apex Mines	7 3*	7 3*	7 3*		7 9*	7 6*
Aurora Wests . . .	—	—	—	7 6*		- -
Bantjes Cons.	5 3*	5 2*	5 2*	5 3*	5 3*	5 4½
Brakpan Mines . . .	54 0	54 3*	54 0*	54 0	53 0*	54 0.
Breyten Colls. . . .	5 0	5 0*	5 0*	5 0*	5 0	5 0*
Brick and Potteries.	-	4 0*	4 0*	4 0*	4 0*	4 0*
Bushveld Tins	0 7*	0 7*	0 7*	0 9*	—	0 9
Cinderella Cons. . .	2 0*	2 0*	2 0*	—	—	—
City Deeps	43 0*	43 0*	-	43 0*	-	42 0*
Clydesdale Colls. . .	—	—	25 6	25 6*	26 3*	26 6*
Con. Diamonds . . .	11 0*	11 6*	- -	10 6*	11 3*	11 3
Con. Investments . .		24 0*	—	23 6*	—	—
Con. Main Reefs . .	10 9*	10 9*	10 9*	10 9*	10 9	10 9*
Coronation Freeholds	0 9*	1 2†	1 2†	1 3†	1 5†	1 0
Do. Syndicates . .	4 0*	-	4 3*	4 3*	4 6*	—
Crown Diamonds . .	2 10*	2 10*	2 10*	2 9*	2 9*	2 10
Crown Mines		—	—		—	41 0†
Daggafontein Mines	3 5*	3 4*	3 3*	3 3*	3 3*	3 3*
E.R. Coals	2 2	2 2	2 2*	2 2*	2 3*	2 3
E.R. Deeps	-	- -	- -	0 6*	0 6*	0 6*
E.R. Proprietary . .	4 10*	4 10*	—	—	4 6	4 6
E.R. Debentures . .	£70†	£66*	£66	£66*	£66*	--
Eastern Golds	—	0 6*	0 6*	0 6*		0 6*
Frank Smith Dmds.	3 3*	3 3*	3 3*	3 3	3 2	3 2
Geduld Props. . . .	47 9	47 6*	47 6*	47 0	48 3	48 3
Glencoe Cols.	13 1*	13 1½	13 3	13 3*	13 3*	13 4*
Govt. Areas.	79 6*	79 0*	79 0*	79 6*	80 0	80 0*
Jupiters	3 9*	3 8*	-	3 9*	- -	3 9*
Knight Centrals . .	3 10*	3 10*	4 0	3 9	3 10*	3 10*
Knights Deeps . . .	15 0*	-	15 1½	15 1*	15 3*	—
Lace Props.	7 6*	7 6	7 9†	-	-	—
Leeuwpoort Tins . .	9 6	9 9	10 3	—	11 6	11 4*
Lydenburg Farms .	4 9*	4 9*	4 9*	4 9*	4 9*	4 9*
Meyer and Charltons	82 0†		82 0†	—	-	—
Modder B.'s	25 0	24 9*	24 9	24 9*	24 6*	25 0
Modder Deeps . . .	44 3	44 3*	44 4½	44 10½	44 6*	44 9*
Modder Easts	11 0	10 9	11 0a	10 6*	10 6*	10 6*
Do. Opts. (4 yrs.)	—	—	- -	0 2†	—	0 3†
Natal Nav. Colls. .	33 9*	33 6*	35 0	35 3*	35 3*	35 0*
New Eland Dmds. .	—	—		—	20 0*	—
New Era Cons. . . .	6 11	7 0	6 9*	6 9*	6 9*	6 9*
New Geduld Deeps .	1 3*	1 3*		1 3*	1 3*	1 3*
New Kleinfonteins .	5 8*	5 8*	5 6*	5 8*	5 8*	5 6*
New Modders	65 3*	65 3*	65 0*	65 9	65 9	65 9
Nourse Mines . . .	—	6 6*	—	—	-	—
Pretoria Cements. .	49 0	49 0*	49 6*	50 0*	50 6*	51 6
Princess Estates . . .	1 2†	—	1 0*	1 1	1 0*	1 0*
Rand Cols.	1 3	1 2*	1 0*	1 2*	-	1 0*
Rand Nucleus	1 0*	—	1 0*	1 0*	-	—
Randfnt. Centrals .	9 0*	9 3*	—	—	8 9*	9 0*
Do. Estates . . .	13 0*	13 10*	13 9*	13 7*	13 9*	13 9*
Roberts Victors . . .	6 9*		6 0*	6 0*	5 6*	5 6*
Rooibergs	4 4*	4 3*	4 4*	5 0	5 0*	4 9*
Ryan Nigels	3 6*	3 6*	—	—	3 6*	—
S.A. Lands	4 6	4 3*	4 3*	4 4	4 4*	4 4*
Springs Mines . . .	34 0*	34 3*	—	34 6	34 3	32 6*
Sub Nigels	12 3*	12 3*	12 0*	12 6	12 6*	12 6*
Swaziland Tins . . .	6 0*	6 0*	—	—	—	—
Trans. Con. Lands .	18 0*	16 0†	18 0*	18 0*	18 0*	18 0*
Trans. G.M. Est. . .	—	7 6*	- -	11 6*	7 9*	7 6*
Van Ryn Deeps . .	72 6*	72 6*	72 6*	72 6*	72 6*	72 3*
Van Dyks	1 3*	-	1 6		1 4*	—
Village Deeps	7 0*	7 3*	-	7 3*	7 3*	7 3*
West Rand Cons. . .			2 0*	2 0*	-	2 0*
Western Rand Est.		3 3*	3 3*	—	3 3*	3 3*
Witbank Colls. . . .	44 0*				44 0*	44 0*
Witwatersrands . .	- -	-	13 0†	13 0†	13 0†	13 0†
Wit. Deeps	6 9*	—	6 3b	—	6 9†	6 9*
S.A. Townships . . .	9 6*	9 6*	9 6*	9 0*	9 6*	10 0*
Wolhuters	3 1	3 0*	3 0*	3 0*	3 0*	3 0*
Zaaiplaats Tins . . .	3 6*	3 6*	3 6*	3 6*	3 9	3 3*
Union 5 per cent. . .	£96¾	£97*	£97¼*	£97¼	£99	£97½*
Hume Pipes	19 0	19 0†	—	19 3*	—	—
New State Areas . .	22 9*	22 9*	22 6*	—	23 0†	22 3
Rouxvilles	2 2*	2 3*	2 3	2 1½	1 6*	1 6*
S. Van Ryns	3 0*	3 0	3 0	2 9	2 3*	—
S.A. Alkali	19 0*	19 4*	20 6*	20 3	20 3	19 6*
Do. Options	—	—	5 6*	—	—	--
Transvaal Silvers . .	29 0	27 3	28 6	27 6	28 3	26 9
West Springs	12 3*	12 3*	12 0*	12 0*	12 3*	12 1½
De Beers	- -	-	—	—	240 0†	240 0†

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Concerning Mines and Men.

Sir George Albu has left for England on a brief business trip.

* * * *

Sir Ernest Oppenheimer returned to the Rand this week after a lengthy business visit to England and America.

* * * *

In connection with the South African Reserve Bank, of which Mr. W. S. Clegg is the Governor and Mr. H. C. Jorisen is the Deputy-Governor, the following appointments have been made on the directorate: Bank representatives, Messrs. W. Dunlop, J. P. Gibson, and J. Postmus; commercial and industrial representatives, Sir E. A. Wallers, K.B.E., Messrs. E. Chappell, K.B.E., and S. J. Marais; Government representatives, the Hon. H. C. Hull, Messrs. Mackeurtan, and J. A. Kolbe.

Transvaal and Delagoa Bay Investment Dividend.

An interim dividend of 10 per cent. has been declared by the Transvaal and Delagoa Bay Investment Company, Ltd., the company that owns and controls both the Transvaal and Delagoa Bay Collieries and the Douglas Colliery. All concerned are to be congratulated on this tangible proof of successful work in face of such difficult times.

Swazi Tin.

The following are the results of the operations of this company for the month of April last:—Concentrate recovered, 26.5 tons; estimated working profit (taking tin at £150 per ton), £12; add adjustments in respect of previous shipments, £623; total profit for the month, £635.

Zaaiplaats Tin.

The results for the months of March and April were as follow:—Mill ran 19 days; capital expenditure, nil; estimated loss for March and April last, including adjustments in respect of previous months, £6,035 7s. 7d.

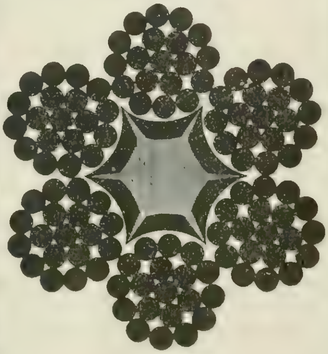
CRAVEN & SPEEDING
BROS.
SUNDERLAND
ENGLAND

"WESTGARTH PATENT CORE"
WIRE ROPE.

It provides greater safety than can be secured by the regulations attached to the New Mines Act, because it is impossible for any acid in the hemp core to corrode the wires in the strands. A rope with an ordinary core frequently appears to be in good condition on the exterior, whilst its interior is in a dangerous condition.

As the strands cannot crush each other there is no internal friction, and in consequence, broken wires are reduced to the minimum.

SAFEST ROPE FOR WINDING AND HAULAGE.



At a normal load there is less elongation and consequently less twist in the shaft than is usual with ropes constructed with ordinary cores.

Prevents disintegration of Hemp Core.

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4810 AIR HOSE

THERE are many reasons—common-sense, business-sense reasons—why you will find "4810" Air Hose supreme for its purpose. "4810" is made solely to deliver compressed air—to deliver it without waste—to resist heat and oil—to withstand enormous pressure and extreme temperature—to give such service as you have never had from Air Hose before. "4810" is armoured — with rubber—that will withstand abrasion better than any wire armoured hose. It is proof against the action of mineral oils. The inner tube will not flake or choke your drills.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

GENERAL POSITION—A DE BEERS SURPRISE—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—HUME PIPE INDUSTRY—RUBBER PRICES IN AMERICA—OILS AND COLOURS—LUIPAARDSVLEI ESTATES AND LOW-GRADE MINES—SOUTH AFRICAN COAL INDUSTRY—RAILWAYS: AMALGAMATIONS AND ELECTRIFICATION—EFFECTS OF COAL STRIKE—UNION-CASTLE LINE—FINANCIAL—METAL MARKET.

General Position.

The week under review has been one of surprises, both pleasant and the reverse.

Rise in the Price of Wool.

Following hard upon the acceptance by Germany last week of the Allies' reparations demands—perhaps because of it—comes the very welcome news that at the last London wool series closing on May 12 prices of wool advanced appreciably, and that nearly all the British Government wool—the huge stocks of which had been the Union's bugbear for so long—had been practically cleared. This means, of course, a tremendous amount of good to the South African farmer and to the country generally. Germany was well to the fore in the bidding for wool, and the competition from the Continent was very keen, pointing to even enhanced prices at the forthcoming wool sales on June 7, owing to the appreciation of French and Belgian currency. The recent bidding seems to show that Germany is now determined to settle down and put her shoulder to the wheel, and indeed it is apparent that the world generally, after the agreement with the latter Power, is inclined to tackle economic problems more seriously than was perhaps possible before the recent settlement; at any rate, the advance in prices should give heart of grace to our wool farmers, and is undoubtedly a factor tending towards better trade conditions. Commercial men, in view of the latest information and the present temper of the miners, are mostly of the opinion that a satisfactory solution of the coal strike will be found by the end of the present month. Locally prices have nominally undergone no change, but the tendency is at the moment inclined to be easier. On the Commercial Exchange business has been extremely quiet, and this has been altogether rather a dull month, but sales of goods under cost have not yet ceased. A prominent importer stated that, in conversation with one of the captains of industry, he gathered the impression that it was thought not improbable that in about three months' time we should experience even a bigger drop in prices than we are witnessing to-day.

Dumping Extraordinary.

Be that as it may, a veritable bombshell was thrown into the commercial camp this week by the receipt by merchants of a circular offering on behalf of the De Beers Diamond Company, owing to the cessation of their operations, huge stocks of stores, amounting in value to considerably more than a quarter of a million sterling, with a "pistol-to-the-head" concluding paragraph reading "It is hoped that merchants will give the matter due consideration, as failing a satisfactory response it is the intention of the company (De Beers) to offer these stocks direct to the mines." This proposed wholesale dumping of stores on an already nervous market has had a very unsettling influence here, and it is asked, with we confess good reason, if an important corporation like De Beers can take such action where does the poor merchant come in? A well-known commercial man said only the other day that prices were soaring sky-high; but what, it is asked, is the likely trend to-day? At all events, this bolt from the "blue" has had a very disquieting effect in local commercial circles.

Iron and Steel.

Business has again been very quiet this week, and prices though nominally unchanged, are inclined to go weaker. Latest quotations: Dunswart, 29s.; Union Steel Corporation, Ltd., ordinary sized rounds, flats, and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. 6d. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 55s.; ⅜ in. iron, 40s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s. 6d.; ⅞ in. to 2 in., rounds, 39s. 6d.; larger sizes, 52s. 6d. to 62s. 6d.; ¼ in. square iron, 60s.; ⅜ in., 47s. 6d.; ½ in. to 2 in. square iron, 38s. 6d.; larger sizes, 45s. to 52s. 6d.; square mild steel, ¾ in., 41s. 6d.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. 6d. to 64s.; channels and joists, 47s. 6d. to 48s. 6d.; imported angles, 45s. 6d. to 47s. 6d.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅝ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in. ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d.; per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. 6d. to 57s. 6d.; shovels, 65s. to 70s.; wheelbarrows, 70s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d.; per 98 lb. coils, 24s. to 25s. per 68 lb. coils; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb. The price for steel at Home remains at about £60 a ton. There is a fair demand for galvanised iron piping, and ½ in. is ruling at about 6d. to 7d. per foot.

Engineering Shops.

Opinions in engineering circles are divided between optimism and pessimism owing to the upheaval at Home, about which it is thought we are getting very little news, which is preventing expansion and at the same time preventing importations; but no doubt the big financial men are just waiting to see how the cat jumps—to see some sign of a settlement. A prominent engineer said, in connection with the coal dispute oversea, man must have a master; no conscientious man in the world can say he can work without one, economical conditions absolutely compel this admission; the employer is the slave, if there be one, being bound by economic conditions and circumstances. The employee can down tools when it pleases him, but the employer has to provide the pay for the workmen and face the position as it may be from time to time. If it were more generally recognised that man must have a master there would, he said, be more hopes of a permanent settlement in all trade disputes. No person desires the services of slaves; if such a condition exists, then the employing classes may be looked upon as being more the slaves of their servants.

Newcastle Iron and Steel Works.

A meeting of the board was held at Newcastle last week for the purpose of giving local and Natal directors an opportunity of seeing the progress which has been made in the works, and they have decided to hold quarterly meetings at Newcastle in future with that end in view. There is still a certain amount of work to be done, and, chiefly owing to their being hampered for sufficient fire bricks, the work with the stoves has not proceeded so rapidly as was anticipated. The output of the brick-making plant having recently been doubled, the work will now go ahead more rapidly, and it is hoped that before many months are over production of pig iron will become an accomplished fact. Owing to the increased cost of labour and the reasons above mentioned, the directors have decided to increase the capital of the company to £150,000, that is 25,000 £1 shares will be issued, present shareholders having the first right, and should any shares not be taken up the public will have the opportunity to subscribe. In the event of over-subscription the shareholders will be allotted their pro rata share. There has been, and still is, constant inquiry for the Newcastle Iron and Steel Co.'s shares from all parts of the country, and the company has no reason to doubt that the 25,000 shares will be rapidly applied for. As regards the pig iron which the company will produce, it is confidently expected that the demand will at least be equal to the supply.

Timber and Building Materials.

Trading has slackened off considerably of late and there is very little activity to report during the past week. Stocks on hand are good and are being added to by fairly steady consignments from the Baltic; 3 x 9 deals and scantlings rule from 1s. 5d. to 1s. 6d.; floorings, 9d. to 9¼d. (a drop of ½d.); ceilings, 6¼d. to 7d.; beaver board, 5d.; oregon, 9s.; pitch pine, 10s. 6d. a cube; corrugated iron, 24 ft. gauge, 10d. to 1s. (a fall of ½d.); furniture timber, Japanese oak, 1 in. to 2 in., 1s. 9d. to 1s. 10d. per sq. ft.; Burmah teak, 21s. 6d. for best, 20s. for seconds; American oak, 1 in. to 3 in., 1s. 6d. to 1s. 8d. per super; American black walnut, 1 in. to 4 in., 1s. 8d. per super; West African mahogany, 1 in. upwards, 2s. 3d. per sq. ft.; 3-ply ash, 5 m.m., 10d. per super. Bricks are selling at: Stock, 70s.; mixed, 60s.; wire cuts, £4 10s. to £5; pressed, £5 per 1,000 at yard; white lime, 7s.; unslaked, 10s. 6d.; blue lime, 4s. 6d.; blue plaster, 5s. 6d.; cement, 11s. 6d. a bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 47s.; 3-ply, 55s. 3d.

Business still remains quiet in the second-hand iron and timber yards; stocks are coming in steadily; prices are: 1s. 2d. for timber and 6d. to 8d. for iron; casements from 9s. to 25s.; doors, 35s. and upwards; mouldings from 2½d.

Electrical Goods.

Trading in town, owing to the Municipality not being in a position to supply at present more current, is rather quiet, but is improving outside, and country orders are increasing in number and importance. The tendency in Britain, in consequence of the coal strike, is for electrical material to advance; everything—wire flex, etc.—is hardening. As regards Continental goods, the Customs levy of 26 per cent. by the Allies is causing a lot of trouble to-day, and nobody is ordering anything just now until he sees where he stands. This duty is at all events stopping the importation of electrical wares from Germany and Austria and even from Holland, few orders being sent compared with some time ago. Everybody seems to be at twos and threes with regard to this 26 per cent. duty. Materials are arriving freely from Britain and all lines are now well stocked. Prices locally remain unchanged at the moment

The Hume Pipe Company Contracts.

The Australian Hume Pipe Company has just secured an order for Hume pipes to the value of over £3,000,000 sterling. This contract is to supply the whole of the piping for a large settler scheme in South Australia: some 20,000 men, with their wives and families, are to be settled on land which when properly irrigated will be amongst the best fruit-growing land in Australia. The irrigation experts appointed by the Government roundly condemn the systems in use in other irrigation settlements, which entail the water being carried over the land in open channels, the loss through percolation and evaporation being enormously high. Hume concrete pipes have been adopted all through this scheme in preference to open furrows. The local company has secured some very valuable contracts lately. During the past month contracts for nearly 40,000 feet of 12-inch pipes for various pressures for the new water scheme between the Rose Deep and New Modderfontein, and also for the supply of a considerable length of 24-inch pipe for the Rand Water Board, have been secured. The pipe line of 7,500 ft., each of which was tested to a pressure of 110 lbs. per square inch, for the Rand Water Board has been laid and completed, and is now awaiting final testing. The present financial year, which closes at the end of June, shows great promise; already orders equal to an increase of 50 per cent. on the last financial year have been booked.

Trend of Rubber Prices in America.

The United States Rubber Co. (S.A.), Ltd., state that, according to information by cable from their head office in New York, prices of cotton and crude rubber show a tendency to harden. It is not anticipated that any further reduction in the prices of the finished article will take place for some considerable time. As a matter of fact, the indications are that there may be a slight increase in prices, as the factories are assuming more normal conditions of trade. The reason for the big drop in prices of rubber goods, particularly in belting and tyres, was due to over-production, and now that this excess of stocks has been absorbed it is assumed that the selling prices will more nearly conform to the actual cost of manufacture; factories produced more than America could absorb and had to sell surplus stocks at prices irrespective of the manufacturing cost.

Oils and Colours.

White lead, 1s. per lb., 45s. per 50 lb. kegs; red lead, 1s. per lb., 11d. per lb in 50 lb. kegs; linseed oil, raw or boiled, small bottle 2s. each, 7 lb. tins 10s. each; 4 imp: gall., 47s. 6d.; turpentine, small bottles, 2s. 6d. each, 12s. 6d. per .83 imp. gall.; turpentine substitute, 7s. 6d. per tin, each 5-6th imp. gall.; finest oxide in oil, 50s. to 65s. per 100 lbs.; English putty, 8d. per lb. in bladders; colours ground in oil, 1s. 6d. to 5s. 6d.; dry colours, 6d. to 5s. 6d. per lb. for ordinary; 4s. 6d. to 22s. 6d. per lb. for best; roof paints, anti-corrosive, 14 lb. tin, 17s. 6d.; 70 lb. drum, 85s.; varnishes, imp. gall., 30s. to 47s.; wall paints, 37s. 6d. per imp. gall.; alum, 9d. per lb.; creosote, 4s. 6d. per 5-6th imp. gall.; gum arabic, 3s. 6d. per lb.; gum benzoin, 7s. per lb.; methylated spirits, bottles 1s., 5s. 6d. per tin 5-6th imp. gall.; caustic soda, 1s. 3d. per lb.; tallow, 1s. 3d. per lb.; coal tar, 17s. 6d. per 4 imp. gall.; bees wax, 2s. per lb.; common glue, 1s. 3d. per lb.; good, 1s. 9d.; finest Russian, 2s.; English gold leaf, plain, 3s. 9d. per book; transferred, 4s. 3d.; aluminium leaf, plain, 1s. 9d. per book; transferred, 2s.; wallpapers and decorations from 1s. 1d. to 21s. per roll.

Oil.

The Cape Oil Company distributors have announced a reduction in the price of petrol of 2s. and of 1s. for paraffin per case.

London reports that in consequence of the coal strike numerous large concerns are considering the question of substituting oil for steam power. Several big undertakings have already made the conversion, and those now contemplating doing so include the underground and tramway power stations at Chelsea, Neasden, Greenwich, Hull, Leeds, etc.

Penrol.

The tests which have been so successfully made in respect of propelling motor cars and cycles have now been extended to the air, when recently in a rotary engine, a capital flight was made by Captain Ross, of the Ross-

Thompson Aviation Co., Ltd. Penrol, it is stated, is equally as good as petrol, and has come to stay. The subscription list, now being issued, is, we hear, being rapidly filled.

Luipaardsvlei Estates and Low-Grade Mines.

As was inevitable, seeing that the gold premium is gradually declining, several of the low-grade mines are now being very hard hit and find it difficult, if at all possible, to make both ends meet. However, this is a matter which has been calculable for some considerable time. With the present wages and salaries ruling, and the existing cost of stores any further decline in the gold premium will bring a number of mines to the Plimsoll mark. The Luipaardsvlei Estates and Gold Mining Co., Ltd., has already been obliged to suggest wage reductions, failing which the mine will be compelled to close down. The board pointed out to the trade unions concerned that the company had lost £9,000 during the last four months, or about 10s. on every ounce of gold mined, and that the mine had practically been run for the benefit of the workers and the storekeepers in Krugersdorp for the past six years, without paying a dividend. The total expenditure in the district, taking wages into account, is £20,000 per month, and there are about 150 white employees on the mine. The trade unions' representatives are to meet the mine workers and ascertain whether they will voluntarily accept a reduction of wages.

South African Coal Industry.

It is an ill wind that blows nobody any good. South Africa is benefiting considerably in consequence of the coal strike in Britain, and the Union is now regaining the position as a coal trader which she lost some months ago owing to the dilatoriness of the authorities in reducing the high railway rates for bunker coal which then prevailed. Delagoa Bay, Durban, and other ports are now being visited by ships which under other circumstances would have coaled elsewhere. Owing to the stoppage of coal mining in Britain, Egypt, the Sudan and the Red Sea ports are unable to get their usual supplies from Britain, and South Africa is reaping the advantage. The coaling plant at Delagoa Bay, owing to some unfortunate mishaps, has found her handling capacity lessened since the beginning of April by an amount of about 3,000 tons a day. The railways raised their bunker rate from 6s. 1d. per ton in 1914 to 36s. 1d. during the War, but have since reduced it to 20s. 8d. It is expected that the existing demand for South African coal will continue for some considerable time, as it will take some months after the strike has terminated to furnish the previous ship supplies.

British Railway Amalgamation.

The new Railway Bill now being introduced in the House of Commons has for its chief object the elimination of competition through the organisation of six geographical groups, in which the principal lines would be amalgamated and the smaller ones absorbed. Tribunals are to be established to settle any difficulties in amalgamation and also a rates tribunal to fix merchandise rates, which will be renewable every three years.

Railway Electrification.

According to the Minister of Railways, Mr. Jagger, the present intention seems to be to proceed with the Durban-Maritzburg line, which it is estimated will make a profit of something like 40 per cent., leaving the Wynberg-Simonstown-Capetown line alone for the present.

From Melbourne it is announced that the figures of running costs show that the partial electrification of the suburban railways there has been most successful, with an annual estimated profit of £191,000.

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Effects of the Coal Strike.

The Parliamentary Secretary for Labour stated in the House of Commons last week that the official figures of persons out of employment on April 30 were: 1,854,000 unemployed and 1,077,000 working short time, compared with 1,506,000 and 888,000 respectively on April 1, when the coal strike began.

There are, it is reported, more than 5,000,000 tons of shipping laid up round the coast for lack of cargoes; 50 coal mines have been flooded since the strike commenced, some of which may never work again, and the balance not be workable for many months. The loss to Britain in vanished trade and diminished producton is incalculable.

South-West Trade.

The Canadian Trade Department, it is reported, has been informed of good openings for goods of Canadian manufacture in the South-West Protectorate, and the Canadian Government is arranging for Canadian ships to call at Walfish Bay. Portuguese West Africa appears also to be attracting Canadian merchants, and should sufficient inducement offer it is proposed that a ship in the Canadian-South African service will call at Lobito Bay on the outward run.

Union-Castle Line.

The British press writes appreciatively of the newest addition, the "Arundel Castle," to this company's fleet, and points out the increasing importance of the commerce between Britain and South Africa. Although this company is hopeful of maintaining a weekly mail to South Africa, the prolonged coal strike may probably necessitate a re-arrangement of sailings. The company states that but for the War the cool chamber space on their steamers would have been doubled, but it is hoped that early next year there will be about 30,000 tons of space available.

Threatened British Shipping Hold-Up.

According to latest reports the stewards' strike referred to in our last week's notes shows signs of collapse, as the companies are bringing stewards from other ports to Southampton, where the strike originated. The Union-Castle boats and the American liners have so far experienced no insuperable difficulties in getting stewards, etc., to ship

Financial.

The New York exchange has reached to 4 dollars per £, which is the highest since April last year.

Local banks and exchange rates: Selling rate for telegraphic transfers and for sight drafts under £500, ½ per cent. premium; buying rate, ½ per cent. discount for telegraphic transfers, and 1¼ per cent. discount for sight drafts.

South African Treasury Bills to the amount of £1,000,000, falling due on October 24, have been placed in London on a basis of 5¾ per cent.

The prospectus of the South African Reserve Bank has now being issued. Applications are invited at par for £700,000; subscription lists close on or before June 4. The directorate is a very influential one. A central site in Pretoria has been secured for the permanent bank premises.

Union Finances: The "Financier," referring to the Union's probable intention to float a loan for development purposes, states that South Africa, compared with other countries, has suffered little financially from the War and taxation is lighter here than in any other part of the Empire; that no Dominion is financially stronger, and that the Union may confidently appeal to investors.

London Metal Exchange.

Latest Quotations: Standard copper, £72 13s. 9d. per ton cash and £71 16s. 3d. forward; electrolytic copper, £73 10s. cash and £74 10s. forward; Straits tin, £179 2s. 6d. cash and £181 2s. 6d. forward; English lead, £24 7s. 6d. cash and £23 17s. 6d. forward; bar silver, 34½d. per oz.; and fine gold, 103s. per oz.

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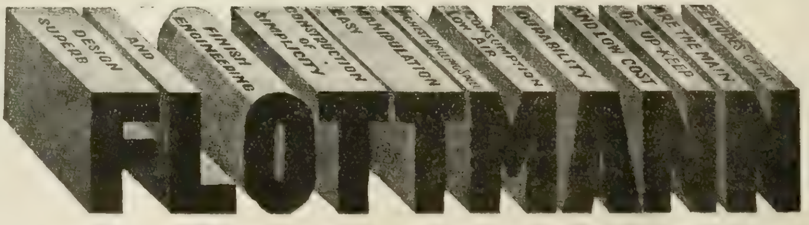

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The Week's Meetings.

MODDERFONTEIN DEEP LEVELS, LTD.

The twentieth ordinary general meeting of shareholders in the Modderfontein Deep Levels, Ltd., was held on May 18, in the board room, Consolidated Building, Fox Street, Johannesburg.

Mr. M. McCormack presided. The total shares represented by proxy or personally at the meeting numbered 638,260. In moving the adoption of the report and accounts for the year ended December 31, 1920, the Chairman said:

Before proceeding with the ordinary business of the meeting, I am sure you would wish me to make a few remarks concerning your late chairman, Mr. Newhouse. You know better than I how ably and how loyally he served your company during his twelve years' association with it. That his resignation is a great loss to your company and to the others of which he was a director I think goes without saying, and, in my opinion and in that of many others who know him well, his departure from the Rand is also a great loss to the gold mining industry. I am sure you will all join with me in wishing him every success in whatever other sphere of activity he elects to enter in the future.

The report and accounts now before you show that ever since 1915, when your company started active operations, its progress, from every point of view, has been uninterrupted. The best results so far obtained were last year, when a total working profit of £891,308 was made on an issued capital of £500,000.

Profit and Loss.

The profit and loss account contained in the report shows that the gross revenue for the year 1920, including premium on gold and sundry revenue, amounted to £1,477,452, which is in excess of the previous year's revenue by £246,185. That excess, as you will have observed, is due largely, almost entirely, to the higher price of gold. As against this, the working costs exceed those of the previous year by £108,446, due to increased wages (European and native) phthisis assessments, and the higher prices of stores.

Adding to the working profit of £891,308 the amount of £10,857, interest, rents, etc., received, the total amount to credit of profit and loss account is brought to £902,165, or £137,739 in excess of the year 1919. Out of this £174,323 was required for taxation, donations, and depreciation, leaving £727,842 to the final credit of the account. The half-yearly dividends Nos. 11 and 12 of 60 per cent. and 85 per cent., respectively, absorbed £726,000, leaving unappropriated £1,842, which, added to the amount of £161,622 brought forward from the previous year, gives the amount of £163,464 shown in the accounts as carried forward to the current year.

In view of the higher prices at which stocks of mine stores had to be purchased during the war period and afterwards, your directors deemed it advisable to provide a further £5,000 for depreciation of the present stocks, reducing the book value of them to £42,564.

Following the policy adopted in previous years, all capital expenditure incurred during the period under review was charged direct to working costs.

The other items contained in the balance sheet and profit and loss account are, I think, self-explanatory, and, therefore, call for no special comment.

Interesting Statistics.

Turning to the purely mining aspect of your company, you will see from the consulting engineer's and the general manager's reports that the ore milled during the year, 507,700 tons, was practically the same quantity as in 1919; that the quantity mined was increased by 35,000 tons, and that surface sorting was increased from 15.56 per cent. to 20.08 per cent. The surface dump was reduced by 7,000 tons, leaving, however, the substantial quantity still unmilled of 175,600 tons.

Further particulars which may be of interest are that the realised value of gold won per ton milled was 57s. 9d., the working costs 22s. 8d., and the working profit 35s. 1d. per ton. The yield per ton was 10.55dwts., a slight increase on that for the year 1919, which was 10.31dwts.

The ore reserves, as re-calculated at December 31, 1920, amounted to 4,100,000 tons, having an assay value of 9.4dwts. over an estimated stoping width of 77 inches. This is an increase of 325,000 tons and an increase of 0.3dwts. in value with the same stoping width as last year, and represents about eight years' developed ore ahead of the mill on the present capacity of the reduction plant.

You will have received the quarterly report to March 31 last reviewing the mining and financial position for that period, which, I think you will agree, discloses a very satisfactory state of affairs. Your consulting engineer reports that the total footage developed between January 1 and April 30 last has been 2,367 feet, of which 1,460 feet have been sampled, 89 per cent. of which is payable, with an average assay value of 18.7dwts. over 44 inches.

There is no doubt that, as your consulting engineer tells you in his report, your mine is in a sound position.

The price of gold, which has fallen heavily in recent months, and which still seems to have a downward tendency, has not been accompanied by a corresponding, or, indeed, any appreciable, reduction in working costs. The effect of this may be that some mines, not so fortunately circumstanced as yours, may be brought to a standstill, a most unpleasant prospect to consider from every point of view.

Comparison with Previous Year.

As regards your company, a comparison between the January to April periods of 1920 and 1921 shows the following position:—

The revenue per ton milled, taking gold at the standard price, during the 1921 period was 45s. 9d., as against 45s. 4d. for 1920. Taking the gold premium into account, and also the higher exchange charges in 1920, the net revenue per ton milled to April 30, 1921, was 56s. 1d. compared with 54s. 7d. for the corresponding period of 1920. You will see, therefore, that so far as the four months to April 30 last are concerned, the gold revenue of your company is higher than for the same period of 1920, the increase being, approximately, £9,000. The working costs, however, have risen by about £5,000, so that the profit for this period, namely, £280,540, is slightly higher than for the January-April period of the previous year.

It is difficult, perhaps unwise, to forecast the course of affairs during the remaining period of the year, but it is possible that the price of gold will rise during the second half of the year, while working costs should not increase, and may show some decrease. The gold premium, however, will eventually disappear; the process may be gradual, but it is inevitable.

To Prevent Closing Down.

Many measures have been suggested for preventing the closing down of low-grade mines, but, in my opinion, the most important and also the simplest of these are higher efficiency and greater economy all round. It is merely a commonplace to say that a large part of the capital of the world was dissipated on land and sea during the late war, and that this has produced the chaotic state to which the world's economic system has been brought. Broadly speaking, that lost capital must be restored before the pre-war economic conditions can again prevail. The process of reconstruction and financial reformation must necessarily be slow, but these can certainly be hastened considerably if everyone will work harder, produce more, and, at the same time, spend as little as possible. These economic principles apply not only to individuals of every class and grade of society, but also to governments, national, provincial, and local, and every other kind of spending authority. They are, I think, especially applicable to the Rand gold mining industry under its present conditions, and it seems to me that, if whole-heartedly and universally adopted, the lives of the poorer mines will be greatly prolonged to the benefit of everyone connected with them. In your case, you are in the fortunate position of having a rich and well organised mine, with a high standard of working efficiency.

Mine Memorial.

You were informed at last year's meeting that it was proposed to erect a memorial in honour of the staff and employes of the mine who were allowed to proceed on active service, some of whom, to our great regret, have made the supreme sacrifice. This memorial has now been completed under the supervision of the architectural firm of Messrs. Solomon and Marshall, and will be unveiled in the near future.

In conclusion, I wish to express your board's appreciation of the very able services rendered to your company during the year by the consulting engineer, Mr. Anderson, and the general manager, Mr. Hill, and to the efficiency and loyalty of the staff and employes generally. I now beg to move: That the directors' report and audited statements of account, as laid on the table, be approved and adopted, and that all matters and things undertaken and discharged by the directors on behalf of the company be, and they are hereby, confirmed.

The report and accounts were adopted.

The appointment of Messrs. M. McCormack and A. F. Mullins in place of Messrs. H. C. Boyd and V. J. Ronketti, resigned, was confirmed, and the subsequent appointment of Mr. E. G. Izod in place of Mr. A. F. Mullins, resigned, was also confirmed.

The retiring directors, Sir Henry Strakosch and Mr. William Ross, were re-elected.

Messrs. Chas. Stuart and F. E. Roberts and Messrs. F. W. Diamond and English were re-appointed auditors for the ensuing year.

GEDULD PROPRIETARY MINES.

The twentieth ordinary general meeting of shareholders in Geduld Proprietary Mines, Ltd., was held on May 18, in the board room, Consolidated Building, Fox Street, Johannesburg.

Mr. M. McCormack presided. The total shares represented by proxy or personally at the meeting numbered 221,632.

In moving the adoption of the report and accounts for the year ended December 31, 1920, the chairman said:

Before commencing the ordinary business of the meeting, I am sure you would all wish me to say a few words by way of official good-bye to Mr. Newhouse, who recently resigned the chairmanship of your company. There is no doubt that he served the company faithfully and well during his long association with it, and I am sure you will all join me in thanking him for his valuable services to the company and in wishing him success in the future

The directors', the consulting engineer's and the general manager's report were circulated some time ago and are now before you for your consideration.

Comparing the results of last year with this, you will have noticed that the quantity of ore milled has been increased by 10,700 tons, the total for 1920 being 526,700. The yield per ton, 7.1 dwt., is practically the same as that of 1919, but, owing to the higher price of gold, the realised value per ton milled was 38s. 10d. in 1920, as compared with 33s. 1d. in the previous year. This rise in value represents the substantial amount of £170,547, making the total yield from gold £1,023,954. Against this, our working costs have risen by 3s. 6d. to 24s. 1d. a ton, this being due, principally, to an increase in the wages bill and the higher prices of stores, amounting to £103,953 The total profit for the year, including sundry revenue, £17,342, was £406,015 and, allowing for excess mine development, taxation, donations, etc., amounting to £94,024, a nett balance of £311,911 remained for appropriation. Of this sum, £205,296 was absorbed by dividends Nos. 11 and 12 of 7½ per cent and 10 per cent. respectively. £50,000 was appropriated for capital expenditure and a balance of £55,547 has been carried forward to the current year.

You will observe from the balance sheet that the total expenditure on capital account for the year was £131,759, of which £81,759 was debited to working capital account and £50,000 appropriated, as already said, from profits Of this capital expenditure, £114,725 was spent on the sinking and equipment of the No. 7 vertical shaft.

Development Work.

The sinking of the No. 7 shaft was delayed somewhat during the first half of the year, owing to the large quantity of water encountered After this water difficulty was overcome much better progress was made. The total footage sunk for the year was 1,198 and, in addition, pump chambers and sumps were cut at depths of 600ft and 1,400ft At the end of April last the shaft had reached a depth of 2,190ft., and your consulting engineer now informs me that the reef should be intersected next month. The connection of the shaft with the cross-cut from the 7th level will be completed towards the end of July.

From the consulting engineer's and general manager's reports you will observe that the chief feature of the year's development has been the disclosure of a block of very high grade ore on the No. 7 level, in the neighbourhood of the new No 7 shaft The total footage exposed in this area at the end of last month was 4,215ft of which 66 per cent is payable and averages 16 1 dwt over an estimated stoping width of 66in You will, therefore realise that a very substantial body of high-grade ore has already been developed in that section of the mine. The limits of the chutes have not yet been determined, but there are good grounds for the expectation that, as development proceeds, a further large ore tonnage of high value will be disclosed.

Owing principally, but not entirely, to the good development results in the No. 7 level area to which I have just referred, the ore reserves have been increased by 640,000 tons, making the total at December 31 last 3,220,000 tons. The value of these reserves has increased from 7.4 dwt. in 1919 to 8 dwt. in 1920, the stoping width remaining unchanged at 61in.

The mine has established a very high standard of efficiency in the breaking of ground in stoping. During 1920 an average of 1.7 square fathoms were broken per machine per shift. I am sure you will be pleased to hear that last month one of your company's emlpoyes, Mr. Ellitson, broke his previous world's fathomage record. With three drilling machines he broke 221 fathoms during 78 machine shifts, which is equal to 2.83 fathoms, or 45 tons broken per machine shift, over a stoping width of 63in., I think a very fine performance.

Your directors have had erected recently a memorial in honour of the members of the staff and employes of the mine who were allowed and could be spared to take part in the late war, some of whom, unhappily, have been killed on active service. The ceremony of the unveiling of the memorial will take place shortly.

I have pleasure in placing on record the appreciation of your board of the very able services rendered to your company by Mr. Anderson, the consulting engineer, and by Mr. Macphail, the general manager, and also of the efficiency and loyalty of the staff and employes generally.

I now beg to move that the directors' report and audited statements of account, as laid on the table be approved and adopted, and that all matters and things undertaken and discharged by the directors on behalf of the company be and they are hereby confirmed

The report and accounts were adopted The appointment of Mr. A. F. Mullins as a director in place of Mr. H. C. Boyd, resigned, was confirmed, and the subsequent appointment of Mr. E. G Izod as a director in place of Mr. A. F. Mullins, resigned, was also confirmed. The retiring directors, Messrs F R Lynch and I. Lewis, were re-elected. Messrs. Chas. Stuart and F. E. Roberts and Messrs. F. W. Diamond and English were reappointed auditors for the ensuing year

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RAND SELECTION CORPORATION.

Mr. F. R. Lynch presided at the annual meeting of the Rand Selection Corporation, Ltd., held on May 17. In moving the adoption of the annual report and accounts, he said:

Gentlemen, At the last annual meeting I referred to the offer made by the Anglo American Corporation whereby it was proposed that your interests and those of the Anglo-American Corporation should be merged, and to the reasons which induced your directors and several of the larger shareholders to accept the offer.

The capital of this corporation was £600,000 in £1 shares, and about 502,158 shares had already been exchanged for Anglo American shares in terms of the offer Since that date a further number of shares have been either exchanged or purchased, with the result that to-day there are only about 53,000 shares which are not held by the Anglo-American Corporation.

Springs Township.

You will remember that our application for an extension of Springs township was granted. The extension comprises 57 business, 33 industrial and 238 residential stands, exclusive of the Government and municipal endowment stands. A number of these stands was sold at a public auction held on August 4, and up to the end of the year, 130 stands had been disposed of, realising a total of £26,337.

Other Holdings.

Your corporation's holdings of shares and interests in other concerns, exclusive of the shares received from Brakpan Mines and Springs Mines when those companies were floated, are fully recorded in the balance sheet, and stand in at £244,617.

We were called upon from time to time during the year by the Consolidated Mines Selection Company to take up our proportion of the shares guaranteed in connection with the acquisition of both the Brakpan and Springs lease. In the case of Brakpan our total participation in the guarantee was 25,000 shares at £5 per share, and during the last year we took up 10,645 shares, which was the balance of our proportion under guarantee. With regard to the guaranteed Springs shares, the number taken up by us was increased to 41,222, leaving ing a balance of 42,947 shares still to be taken up at call at £3 each, in terms of our agreement. The total number of shares held by us in these two companies at the end of the year amounted to 277,000 Brakpans and 292,722 Springs, including the shares shown in our property account.

Since the end of 1920, the corporation has taken up a further 1,292 Springs shares, and its present holding in that company has, therefore, been increased to 294,014 shares.

During the period under review £2,550 was expended on tree planting. The total number of trees so far planted amounts to 579,775, of which 43,000 were planted during last year.

Larger Proffits.

The year through which we have just passed was much more successful than 1919 from the point of view of profits, as £216,129 was received by way of revenue as compared with £159,605. This increase is mainly due to the larger dividends received from our shareholdings, which advanced by more than £100,000, whilst underwriters' commission increased from £274 to £4,867; but, as against this, the revenue from townships has fallen by about £33,700, and the profit realised by the sale of shares shows a reduction of over £20,000.

Our expenditure for the year shows an increase of about £2,750, including an increase of about £1,300 in the London office expenses, due to the extra work involved in the acquisition of the enemy shares and in the Anglo-American merger, and also including the £1,750 bonus paid to retiring directors, to which I have already referred. Donations show a small reduction of about £380.

The balance of profit and loss account was £199,927, to which must be added the following sums:—£22,020 carried forward from 1919; £2,284 over-provided for in connection with taxation; and £128,149 transferred from share premium account, making a total of £352,381 to the credit of the appropriation account

The balance of the share premium account, amounting to £128,149, together with £4,295 from profits, making a total of £132,444, was appropriated for the writing down of certain shares and interests in other concerns to conform with their present lower market value.

The sum of £2,160 appropriated for Government taxation is considerably less than last year, partly through our revenue being derived mainly from dividends, which are taxed at their source, and partly because there has been a reduction of about £3.000 in the amount provided to meet possible English income tax.

Dividend Distribution.

The dividend distribution of £165,000, or 27½ per cent., is about £25,000 less than in 1919, but you will remember that in the latter year the dividend distribution included certain enemy shares purchased from the Custodian of Enemy Property, for the acquisition of which £65.000 of the profits accumulated in previous years was utilised. Seeing that the carry forward was increased from £22,020 to £52.776 in 1920, it is clear that the position of the corporation has been materially strengthened.

I think, gentlemen, we have every reason to be satisfied with the results of last year's operations, especially as the depression which has prevailed afforded us little opportunity for successful market operations.

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BRAKPAN MINES.

The annual meeting of the Brakpan Mines, Ltd., was held in the board room, Corner House, on May 17, Mr. F. R. Lynch presiding.

The chairman, in moving the adoption of the annual report and balance sheet, said:—

Gentlemen, You may remember that when this company secured its Government lease, an agreement was entered into with the Consolidated Mines Selection Company whereby that company guaranteed a new issue of 100,000 shares at £5 each in order to provide the additional working capital required for purposes of the lease.

At the end of 1919 73,600 new shares had been taken up, and during last year the balance of 26.400 was issued. The authorised and issued capital of your company is, therefore, £850.000, in 850,000 shares of £1 each. The tonnage crushed for the quarter shows an increase and working costs seem inclined to fall. Both these factors have a considerable influence on the monthly profits, and I hope that as the year progresses these favourable tendencies will become more marked.

Working Profit.

You will observe from the financial statements attached to the annual report that the working profit for the year, reckoning gold at the standard price, was £206,220, to which must be added, for the premium on gold, £343,072. After deducting £6,908, the realised loss on stores purchased during the war period, there remains a total working profit of £542,385. This shows an increase of £120,000, as compared with the results for 1919.

Provincial Taxation.

The sums paid for taxation and participation do not need explanation, but I am pleased to be able to say that the Union Government has decided that the Provincial Government shall not be allowed to tax the mining industry after this year.

The amount spent on development during the year slightly exceeded the fixed charge to working costs of 5s. per ton milled, and it has been necessary, therefore, to provide this excess out of profits. The £500,000 provided for capital expenditure by the issue of 100,000 new shares at £5 each, for the exploitation of the lease area, having become almost exhausted, and as it was necessary to provide additional funds for further shaft sinking, equipment and development work, your directors decided that it was in the best interests of the company to provide portion of such additional money out of profits. £125,000 was, therefore, appropriated for this purpose. In addition, £25,000 was appropriated for the reorganisation of plant and machinery. This is rather an unusual item and is to meet certain expenditure on plant, etc., in the old area which is necessary in connection with operations in the new lease area. Such special expenditure cannot reasonably be allocated to capital account, nor can it be fairly included in working costs, and it has therefore been provided for in the appropriation account. At the last annual meeting I drew attention to the amount invested in stores under the headings "general" and "construction." The "construction" stores account shows an increase owing to the large amount of construction work now in progress, but I am pleased to be able to report that the substantial reduction of £21,000 in the "general" stores account has been effected. It is confidentially anticipated that a further reduction will be made during the current year. I am very doubtful that prices will ever be sufficiently reduced to permit us to decrease our standard stock figures to the pre-war level, but every effort is being made to reduce the stocks to the lowest safety limit.

Investments.

You will observe that the company has acquired 1.500 shares in the Transvaal Wholesale Company, and 1.515 shares and £3.485 debentures in the Rand Refinery, Ltd. The investment in the Transvaal Wholesale Company was intended to assist our employes to reduce their cost of living, and I believe this very desirable result has, to some extent, been achieved. The Rand Refinery, Limited, is establishing a refinery here in order to treat the gold output of the industry, and I have little doubt that it will result in considerable benefit to your company. That, gentlemen, concludes my review of the company's operations last year, but before concluding I propose to make a few remarks about the immediate future of the property. Last year we had to face several adverse factors, such as increased wages and higher prices for stores, these being no doubt due to the increase in the cost of living which has been experienced in all parts of the world. The cost of living has shown a considerable drop since the end of the year, and a reduction in the price of stores is in evidence. In due time wages, which increased with the cost of living, must therefore be reduced, and necessarily so if this industry is to thrive, because present indications are that our gold will not again reach the high water mark of February, 1920, viz., £6 7s. 6d., and it is doubtful whether even the November, 1920, price of £6 will again be reached. Under the circumstances therefore, lower wages cheaper stores and greater efficiency will have to come into being, otherwise many mines on these fields will cease operations.

No Cause for Pessimism.

Given these factors and a freedom from industrial disputes, I see no justification for pessimism. We have a large property, of which by far the greater part, favourably situated, is still unexplored. So far we have been developing from the No. 2 shaft towards the lease area, and you will be able to form an idea of our difficulties when I tell you that the main incline has been advanced to a point no less than 9,000 feet from the No. 2 shaft. The problems of ventilation and transport in the southern section, although solved now, have affected working costs. Moreover, we have not had the opportunities for rapid development off this long incline which we had hoped for, owing to the reef being faulted or thrown by dykes. At the end of April there remained a distance of 1.340 feet to be driven before the point opposite No. 3 shaft could be reached. You will agree that our position will be quite different when this connection is made. By the end of the year this work should be completed, and the development from Nos. 3 and 4 shafts will be advanced towards effecting the connection between these shafts. We shall then have every opportunity for rapid development in a virgin area of the mine, besides having improved facilities for following up the existing ore bodies in the older portions of our property. The railway which will connect the new shafts with the reduction plant is making favourable progress, and it is expected that the portion from No. 3 shaft will be put into commission by the end of the next quarter. Assuming a reasonable amount of luck in the lease area there is no reason why the present capacity of our plant, viz., 75,000 tons per month, should not be fully occupied, after allowing for some time to effect the necessary development. The No. 3 shaft is expected to intersect the reef shortly, and the strike of a rich ore body in this area will have a considerable bearing upon the date when the maximum tonnage capable of being dealt with by the present plant will be reached.

Future Bright.

The future of your company promises to be bright, and I personally am confident that this promise will be realised.

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ANGLO-AMERICAN CORPORATION.

At the annual meeting of the Anglo-American Corporation of South Africa, Ltd., held on May 18, in the Corner House, 2,034,993 shares were represented by person or proxy.

Sir Ernest Oppenheimer, the chairman of the company, who presided, said: At our last annual meeting, I gave you a full account of the Company's operations up to May. To-day we are assembled to review the affairs af the company for the whole of last year, and I propose first to refresh your memories by outlining briefly the more important events of the early part of the year before discussing more fully the later events, which are new to you.

You will remember that the original subscribers of the corporation's capital held a five years' option to take up a further 1,000,000 shares at par. In Mrach last year the option holders were persuaded to exercise their options, in view of the necessity of providing further funds to enable the corporation to acquire an interest in the Consolidated Diamond Mines of South-West Africa, Limited, and the capital of the corporation was increased to £2,000.000, by the issue to them of 1.000,000 shares.

In May an extraordinary general meeting was held for the purpose of authorising certain amendments to the corporation's articles of association, namely:—

(1) To increase the authorised capital from £2,000,000 to £4,000,000. (2) To increase the authorised number of directors from six to twelve. (3) To reduce the percentage of profits payable to ordinary directors from 2½ per cent. to 1¼ per cent. (4) To increase the minimum amount of such distribution from £1,000 to £2,500 per annum, and to fix a maximum of £1,250, payable to each ordinary director, intead of an unlimited amount. (5) To confirm the agreement entered into with the two permanent directors whereby the percentage of profits payable to them were reduced from 5 per cent. and 2½ per cent. to 2½ per cent. and 1¼ per cent. respectively.

These amendments were rendered desirable by reason of the agreement whereby the interests of this corporation and those of the Rand Selection Corporation were merged. The authority to increase the number of the directors to twelve enabled representation to be offered to certain interests which had become largely concerned in this corporation through the merger. The reduction in the percentage of profits payable to the permanent directors was agreed to voluntarily by Mr. Honnold and myself, as we felt that the enormous increase in the corporation's interests had increased our possible remuneration beyond what was originally contemplated when the company was formed.

Following on the increase of the authorised capital from £2,000,000 to £4,000,000, 1,320,000 £1 shares were created in order to provide the shares necessary to issue to Rand Selection Corporation shareholders if they decided to exchange their shares for shares in this corporation, on the basis of 5 for 11 in terms of the merger agreement. The registered capital of the corporation was thus increased to £3,320,000. 542,740 Rand Selection shares were offered for exchange during the year, and 1,194,028 of our shares were accordingly issued, increasing the issued capital of the Corporation to £3,194,028.

The issued capital of the Rand Selection Corporation is £600,000 in £1 shares and, therefore, only 57,260 shares remained in circulation at the date of expiry of the exchange offer. We have since purchased a number of these shares, and now there remain only about 53,000 shares which do not belong to our Corporation.

Four of the six new seats on the board were filled, and you will be asked to confirm the appointment of Messrs. W. E. Hudson, F. R. Lyuch, W. McDermott and W.J. O'Brien as directors of the Corporation.

While on the subject of the directorate, I should like to take this opportunity of extending a cordial welcome to Mr. J. S. Wetzlar, managing director of the Consolidated Mines Selection Company, who has recently become a member of our London committee. It is a number of years since Mr. Wetzlar was on the Rand, and I am sure he will be very favourably impressed by the progress and development of these fields during those years.

We have had another distinguished visitor whom I should like to allude to Mr. John W. Finch. Mr. Finch made a brief visit to this country on behalf of our American shareholders, who, as you know, are largely interested in the affairs of our corporation, and I believe he has found the mining practice of the Witwatersrand little, if at all, behind the practice of other parts of the world which he has visited.

Coal Options.

Having formed the opinion that the coal industry in South Africa offers great possibility for successful business, your board were fortunate enough to be able to acquire options over a number of coal farms favourably situated in the Middelburg and Bethal districts. Considerable prospecting work has been done by means of bore-holes, and I am pleased to say that in this way a very large area of country has been proved to contain coal of excellent quality.

It was found desirable that these coal interests should be managed and further exploited as a separate business, and for this purpose a new company, under the style and title of "Transvaal Coal Corporation, Limited," was formed, with a capital of £250,000, in £1 shares, all of which are held by your corporation.

Numbers of other coal farms in the vicinity of our properties have been taken up by other corporations, and I believe that a vast new coal field has been discovered which will some day prove of incalculable value to South Africa. But, unfortunately, the district is very badly served by railways, and before this key industry can be developed, the Government must provide more railway facilities.

No new interests except coal have been acquired during the year, although a number were submitted to the corporation. Several of the propositions were not without merit, but it was thought wise, in view of the unsettled condition of the world, to restrict our activities for the time to those interests which could effectively be watched and controlled from the Johannesburg office of the corporation.

I am afraid I have tried your patience by commenting at considerable length upon the various concerns in which this corporation is interested. Many of our shareholders are in remote parts of the world where they are unable to obtain the detailed information given at the annual meetings of the various companies here, and it is for this reason that I have had to claim your kind indulgence to-day.

Financial Figures.

The considerably increased operations of the corporation during the year are reflected in the financial statement before you. Dividends received have increased from £17,050 to £153,950; interest and commissions from £14,812 to £144,159; profits on shares from £67,071 to £87,769; and a new source of revenue, "fees received," produced £3,969; which makes a grand total of £389,847, as compared with £98,934, in 1919. Expenditure has, of necessity, also increased with the expansion of the corporation's business. For example, the directors' and auditors' fees account shows an increase of £15,000, due to the directors' participation in profits on account of dividend distributions; the sundry general expenses account has increased by about £6,000, and an amount of £6,300 has been paid for stamp and share capital duty.

You will notice an item in the profit and loss account of £7,833 2s. 2d. for London office expenses, which seems to indicate a considerable increase in these expenses, but included in the sum is £3,702 6s. 7d., which was paid for the corporation's English income tax. In reality, therefore, the expenses of the London office amounted to £4,131.

The net result of comparing the two years, however, is that last year a profit of £347,700 was earned, as against £88,828 in 1919, and if you add the balance of £131,904, carried forward from 1919, it shows that the total sum to the credit of the appropriation account amounted to £479,604. This sum has been dealt with as follows:—£8,971 was appropriated for Government taxation; £318,332 for dividends Nos. 1 and 2, of 5 per cent. each; and the balance of £152,301 unappropriated profit shows an increase of £20,400 on the amount carried forward.

The original book cost of the corporation's shares and interests in mining ventures amounted to a total of £3,984,480, but you will notice that the book cost at the 31st December last was reduced to £3,163,586 by the writing off of £820,894. This sum represents the premium received by the corporation from the exchange of its shares for Rand Selection shares, calculated at the then market price of the shares, it being practically a premium of 13s. 9d. per share on the par value of the issue of 1,194,028 shares. In view of the nature of the transaction your directors thought it right that the corporation's share account should benefit.

I think you will agree with me that notwithstanding the depressed condition of the financial world, the corporation has had a very prosperous year, and when it is remembered that several of our large interests are still non-productive there is every reason to look forward to the future of the corporation with confidence. In the past I have ventured to express an optimistic opinion as to our future, and I have no reason now to change that view.

The gold mines in which we are largely interested are classed as "high grade" propositions. They have already proved very valuable, and as the larger part of these areas are still unexplored there is every reason to hope that further development will serve to increase the value of these properties. We have considerable investments in several properties, which, although not yet productive, give promise of great potential value.

The Diamond Trade.

I have already reviewed the position of the Consolidated Diamond Company, but, as we are so largely concerned in diamonds, a few remarks on the diamond trade and its future prospects may be of interest to you.

It is generally known that America is the principal buyer of diamonds, and it is not surprising, therefore, that a severe trade depression in that country should be reflected in the position of the diamond producing mines of this country. America, in common with other countries, has been passing through a most severe crisis, and the diamond trade has suffered in consequence. The American crisis is in itself a sufficient reason for the serious depression in the diamond trade, but the position has been accentuated by two other factors. Russia, Central Europe, Italy, Turkey, and other countries which were substantial purchasers of diamonds before the war, have not only suspended their buying for the time being, but have become sellers. This is especially so in the case of Russia. Many Russians who fled from their country carried with them their portable wealth in the form of precious stones, which they converted into cash as the necessity arose. In addition the Bolshevist Government confiscated large quantities of diamonds during the revolution, and sent them to Europe and America for disposal. These diamonds have been and are still being sold at low prices.

The present crisis is, I think, the most severe that the diamond trade has ever had to face, but in the light of previous experiences of a similar nature, I am confident that the storm will be safely weathered.

The four big diamond producers and the diamond syndicate came to a satisfactory agreement at the conference recently held in Capetown, which I attended, and my opinion that there will be, in the not too far distant future, a revival in the diamond trade has been strengthened.

The conference confirmed the two cardinal principles of the diamond trade: firstly, that the sale of diamonds must be controlled, which means that each producer limits his sale to a fixed proportion of the total, and avoids forcing diamonds on the market which cannot be absorbed; secondly, that the sale of diamonds must be carried out through one channel or organisation.

It was by the firm adherence to these two principles that former depressions in the diamond trade were successfully overcome, and diamond investments, over a period, were made so remunerative. Having in view the history of the diamond business, I regard our large holding in the Consolidated Company with the greatest confidence.

I have just returned to Johannesburg after an absence of about seven months. I spent several months in America, and took the opportunity of discussing the affairs of our Corporation with your American directors and the members of the New York committee, in order to give them the latest position of our various interests, and to discuss our future prospects. One result of my visit is that active steps are being taken to introduce our shares on the New York market.

Having in mind the great possibilities in South Africa for successful business in the future, I visited many industrial and other concerns in America in order to obtain knowledge which may be useful, in considering new proposals for business that may be submitted to us. I only hope that I shall be given many opportunities of using the experience in these matters I gained in America.

Mr. Honnold, one of your permanent directors, accompanied me on my visit, and I should like to express my cordial thanks to him for his many acts of kindness and for having made it possible for me to inspect many mining and industrial concerns which otherwise I should not have seen.

Before concluding, I desire to express our thanks to the secretarial and engineering staffs in Johannesburg, London and New York, for their excellent services to the Corporation during the year.

NEW ERA CONSOLIDATED.

The annual meeting of the New Era Consolidated was held in the board room, Corner House, on May 17, Mr. F. R. Lynch presiding.

In moving the adoption of the annual report and balance sheet, the chairman said: -

Gentlemen, Last year when I had the privilege of addressing you I expressed the view that although it was true that the mining industry—from which our company derives a considerable portion of its revenue was passing through an anxious time, yet in contrast to our former prosperity we were inclined to magnify the depression. Judging from the profits earned during 1920 the opinion expressed appears to have been justified. Prices generally have fallen and naturally the market prices of our various holdings have also been marked down. Nevertheless, we have been able not only to write certain of our shareholdings down considerably, but also to pay a good dividend and maintain the amount carried forward as unappropriate balance for 1919.

At December 31 last the shareholding of the company stood in the books at £111,535, whereas the market value at the same date was £174,283, and to-day's value is £166,116, not counting 141 Springs shares and a 2s. call on our West Springs holding, paid for since the end of the year.

I drew your attention last year to the 5 per cent. participation which this company had accepted in the Consolidated Mines Selection Company's guaranteed loan to Daggafontein Mines, Limited. The amount of this loan was increased during the year from £250,000 to £450,000, in order to provide additional funds for the uninterrupted continuance of mining operations, and we agreed to accept a similar percentage of participation in the additional guarantee. For a considerable time this loan was financed by the principle guarantors, but since the end of the year we have paid our 5 per cent. of the £450,000 loan, namely £22,500.

Increase in Revenue.

Referring now to the last profit and loss account, you will observe that the company's revenue from all sources shows an increase compared to the previous year. Dividends received improved by £7,445, mainly due to the increased dividend paid by Brakpan Mines, and to the re-entry of Springs Mines into the list of dividend payers. Underwriters' commission advanced from under £20 to £1,310, and the revenue derived from interest, sale of shares, etc., all show slight increases. Owing to the property account standing at only £1, the amount received from the sale of the company's interest in the Schapenrust claims has been credited to profit and loss account. The company's total revenue for the year was £36,927, as compared to £28,681 for 1919.

Our expenditure for the period under review was slightly greater than the previous year, expenses in connection with our London agency being the cause of this increase.

The total profit for the year amounted to £31,856, to which must be added £13,385, the balance of unappropriated profit carried forward from 1919, and £575 refunded from dividend tax, making a total available profit of £45,817. The following sums have been appropriated from this profit: £266 for Government taxation, £20,000 for payment of dividend, and £12,164 to provide for the lower market value of certain of our shareholdings, leaving an unappropriated balance of £13,386 to carry forward into this year.

The dividend declaration of 20 per cent. is less than the equivalent of the 1919 dividend, but you will remember in that year the enemy shares purchased from the Custodian of Enemy Property were issued by way of dividend. The distribution in 1919 amounted to the equivalent of a 29.75 per cent. cash and distribution, which was greater than the profit earned during the year, the shortage being provided for out of the unappropriated balance of the previous year.

SPRINGS MINES.

The annual meeting of the Springs Mines, Ltd., was held on May 17, in the board room, Corner House, Mr. F. R. Lynch presiding.

The chairman, in moving the adoption of the annual report and accounts, said: Gentlemen, The annual report and accounts for the year have been in your hands for some time, and I will, therefore, confine my remarks to-day to calling your attention to the outstanding features of last year's operations, and to reviewing the more recent work of the company and its future prospects.

Development of Eastern Portion.

A feature which I bring to your special notice is the primary development on the eastern portion of your property. By referring to the plan attached to the annual report you will observe that except for the main haulage ways little exploration work has been done in that section of the mine. It is anticipated that during the current year the south-east haulage from the north shaft will be connected with the thirteenth level east by way of the north-east haulage from the east haulage, south shaft, and then through 4G and 4H haulages a distance of 10,000 feet, In addition it is anticipated that the remaining portion of this alternate connection between the thirteenth east drive and No. 3 shaft will be completed early in the new year, which will increase the length of the connection to a total of 11,300 feet. The real importance of this, apart from the advantages to the ventilation system, is that it will provide new points of attack for subsidiary development along a length of 11,300 feet, and therefore, as you will readily see, the extent and rapidity of the development of this area will depend only on the amount of money available for the purpose. You will observe also that the alternate connection between No. 1 and No. 2 shafts, through the western section of the mine, is nearly completed. This will not have the same important bearing on the future development of the mine, because a considerable portion of this area has already been explored, but it will offer suitable points of attack for further development, and will also be of material advantage to the general system of transport and ventilation.

Best Ventilation System.

On the subject of ventilation, it may interest you to learn that last August the Government Inspector of Ventilation and Dust submitted a report to the Inspector of Mines on certain installations made by your manager for the improvement of mine ventilation. The concluding paragraphs of the report read as follows: 'There cannot be any doubt of the complete suitability of this ventilation system to the proposed development. This system should be widely used in the long headings on the Far East Rand. It is easily the best method devised so far and produces cool and pleasant conditions in places that otherwise would be very hot and oppressive. It is inexpensive, simple, effective and decisive, and is the first successful engineering attack on an important problem in ventilation." You will agree with me, I think, gentlemen, that your manager and his officials have every reason to be proud of this unsolicited testimonial from the Government. The large development programme carried out during the year, I am pleased to say, has been of considerable benefit to the ore reserve. At December 31, 1919, the ore reserve was estimated at 2,417,298 tons, averaging 8.74 dwts. over 62.92 inches. At June 30, 1920, the ore reserve had increased to 2,569,207 tons, valued at 8.75 dwts. over 63.16 inches, and at December 31 last it was estimated at 2,726,178 tons, averaging 8.76 dwts. over 63.48 inches. During the year, therefore, there was an increase of 308,880 tons, and the value and width remained practically unchanged. The increase in the ore reserve is very gratifying, especially as your consulting engineer reports that a general survey of the position indicates that there will probably be a further increase as at June 30 next. This raises the question of an increase in the monthly output, which is bound up with that of the ore reserve. At present the ore reserve is about six years ahead of the mill, and as development proceeds, especially with the additional facilities afforded by the connection between No. 2 and No. 3 shafts, there is every reason to anticpate that the ore reserve will show a gradual increase and thus warrant an increase in our reduction plant.

Tube Milling Experiments.

Certain tube milling experiments which were initiated at Brakpan Mines are now being conducted at Springs Mines and if the promise of success which they show is realised your directors and consulting engineer will take the fullest advantage of these results when considering the advisability of installing additional plant. The success of the experiments is of special importance to the company because it would enable us to adopt a variation of the existing standard process at a considerably smaller capital outlay. The reef was encountered in the No. 3 shaft on May 30 last year and the cutting of the sump was completed on July 8. Work in this section was then concentrated on making the connection with the south haulage No. 2 shaft, which was effected in September. Development was pushed forward as rapidly as possible, and the reef, which was faulted immediately south of the shaft, has since been located. I will deal with this subject later on in the course of my remarks. The No. 4 shaft was only sunk 94 feet during 1920, when it became necessary to stop the work until such time as the permanent steel headgear, boilers and winding engines have been erected. The quarterly reports issued to shareholders on April 22 contain full details of the work accomplished to March 31. About 111,200 tons of ore were crushed at a cost of 31s. 3d. per ton, yielding a net profit of £77,675, including the gold premium. The yield was 36s. 10d., calculated at the standard price of gold. In addition, the amount actually realised on account of gold premium for the three months ended February 28 was £1,590 in excess of the estimated premium and this sum must, therefore, be added to the profit, which is thereby increased to £79,263. The yield shows a decrease of 1s. per ton as compared with the average for last year, and costs an increase of 7d. per ton.

February Strike.

Although mining expenses show a reduction of 5d. per ton for the quarter, the expenses connected with the February strike amounted to 1s. per ton on the total tonnage crushed for the quarter, and but for this unfortunate event, instead of our costs showing an increase, we should have shown a material reduction. The development for the quarter amounted to 4,443 feet, of which 3,598 feet were on reef averaging 23.80 dwts. over 16.39 inches. 1,975 feet or 56.8 per cent. of the footage on the reef were payable and averaged 30.10 dwts. over 20.93 inches or 630 inch dwts. These results proved to be considerably higher than the value of the ore reserve as estimated by your consulting engineer at the end of the year. The 4I haulage way from No. 3 shaft, in which the reef had been picked up after faulting, as I mentioned to you a few minutes ago, was started in a south-westerly direction from the shaft. The assay values of the reef which has so far been sampled give very excellent values for 75 feet, the average value being 17.9 dwts. over 38.9 inches, or 696 inch dwts. This is a strike in virgin ground, and if, on further exploitation, it proves to be a large shoot, as I hope it will, then the ore reserve will be materially increased, and the day when the monthly output can also be increased will be hastened. Another point worth mentioning is that good results have been obtained from the eighth west haulage. In the last 800 feet this heading has indicated payable ore of satisfactory grade. There only remains a distance of 40 feet to be driven before the West Springs boundary is reached. The Anglo-American Corporation agreed, in view of the delay in reaching the reef in the No. 1 shaft, to extend the West Springs options which it had granted to shareholders in our company, for a further period of six months from January 9 to June 9, 1921. The reef, as already stated, was encountered on the 7th of last month, but unfortunately the values obtained were very disappointing, with the result, I regret to say, that the market price of the shares is too low to make it likely that the options will be exercised.

Option Certificates.

Several shareholders have asked us to use our best endeavours to obtain a further extension of the options, but the Anglo American Corporation has not seen its way clear to agree to the suggestion, and I do not see any hope of being able to induce it to reconsider its decision. There is every justification, of course, for the attitude of the Anglo-American Corporation, because the option certificates were issued free to the shareholders of Springs Mines, Limited

A Rand Refinery.

Your interests in other concerns have been increased by the purchase of 1,500 shares in the Transvaal Wholesale Company, Ltd., and also 1,307 shares and £3,005 8 per cent. debentures in the Rand Refinery, Ltd. The Rand Refinery, Ltd., is erecting a refinery here in order to treat the gold output of these fields and I believe it will prove of considerable benefit to the mining industry

When I had the privilege of addressing you at the last annual meeting, I expressed rather optimistic views in respect of the future of your company. In reviewing the operations for the year, I consider that my optimism has been justified. A profit of £435,124 was earned, of which £251,372 was distributed in dividends, and in addition the ore reserve was increased by 308,000 tons. You will agree with me, I think, that these results are both important and gratifying. It is impossible to hazard an opinion as to the probable dividend distribution for 1921, because it depends so much on unknown factors such as the gold premium, wages, costs of stores, etc. But I do think that as the present excellent results from development promise an increase in the ore reserves the day is approaching when we shall be fully justified in increasing our plant, which will, I hope, result in a reduction of working costs and an increase in annual dividends

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WEST SPRINGS.

The annual meeting of the West Springs, Ltd., was held on May 17, in the board room, Corner House, Sir Ernest Oppenheimer presiding.

The chairman in moving the adoption of report and accounts said:

Gentlemen.—Although since the last general meeting there has been considerable progress in the opening up of your property, it was still practically in the shaft sinking stage at the end of 1920.

During the first quarter of this year, the east haulage was driven 250ft., of which 187 were often reef. 195ft. were sampled and gave an average assay value of 9.41dwt. over 40.82in. The north east haulage was advanced 267ft. of which 225 were on reef and gave an average assay value of 5.90dwt. over 30.71in.

Of the footage sampled during the quarter, 245ft., equivalent to 58 per cent. showed payable assays, averaging 9.39dwt. over 30.57in.

Since March 31, the east haulage has been driven a further 68ft. off reef. The north east haulage has been advanced a further 166ft. during the current quarter, of which 120ft. have been sampled and have given an average assay value of 12.1dwt. over 18.1in. The 8th, west haulage from Springs Mines has approached to within 40ft. of the West Springs boundary, and will therefore provide a new point of attack within the next few days for the development of your property. The reef at the end of the haulage is payable, and as the shoot trends in the direction of our property, we hope the good results will continue.

Connection with Springs Mines.

At the end of last month, the distance to be driven to connect the east haulage with the No. 1 shaft was about 2,100 ft. It is expected that the heading east from the No. 1 shaft will be started during the third quarter, and that, given favourable conditions, there is a possibility that the connection between this shaft and Springs Mines by means of this haulaeg will be effected early in 1922. As a result of the agreement with Springs Mines, which enables this work to be done, the development of your property has been considerably advanced in point of time.

The payable values so far disclosed by the limited amount of development work in the mine are as follows:—A total of 2,010ft. has been sampled in the east haulage from the Springs boundary, of which the first 425ft. were unpayable, the next 420ft. were payable, giving 14 dwt. over 26.7in.; the next 673ft. were unpayable, followed by 397ft. of payable reef, assaying 5.7dwt. over 49in., and the last 95ft. were also payable, averaging 13.3dwt. over 36.4in.

An encouraging feature is the width of reef disclosed at the No. 1 shaft and in the development work, because the opening out of payable shoots with such reef widths will result in correspondingly increased ore reserve tonnage within the limits of the shoots.

In the course of my speech at the last annual meeting I referred to a matter of particular interest, the caving in of the original No. 1 shaft, and stated that the present No. 1 shaft had, so far, not encountered the large dyke which had unfortunately appeared in the original shaft. I am pleased to be able to say now that our good luck in the new shaft continued all the way down until the reef was encountered in due course, and therefore the caving in of the original shaft proved a blessing in disguise.

Equipment Work.

Your mine manager in his report calls special attention both to the equipment of the shafts and to the work which has been done during the year.

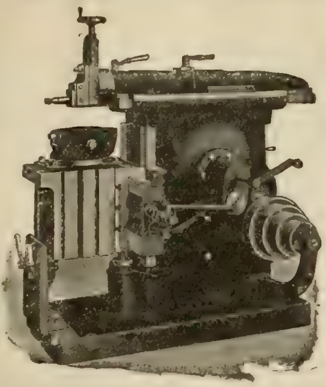
The total expenditure on shaft sinking, etc., from the inception of the company, the details of which are set out in the schedules attached to the annual report, amounted to £663,028 at the end of the year, and of this sum £343,401 was expended during last year.

We were fortunate in having been able to acquire two 75-drill compressors from Simmer Deep, and thereby effecting a substantial saving in initial cost. Since the end of the year, we have purchased from Daggafontein Mines, Limited, certain pumps for the No. 2 shaft at practically cost price. The purchase of this pumping equipment was advantageous, its installation as the permanent pumping equipment at the No. 2 shaft will be undertaken almost immediately, and the plant brought into commission at an early date. The result will be to enable us to cope more readily with the water in this shaft, and thereby expedite sinking operations.

The Anglo American Corporation agreed, in view of the delay in reaching the reef in the No. 1 shaft, to extend the West Springs options (which it had granted to Springs Mines shareholders) for a further period of five months, from January 9 to June 9, 1921. The reef, as already stated, was encountered on the 7th of last month, but unfortunately the values obtained were very disappointing, with the result, I regret to say, that the market price of the shares is too low to make it likely that the options will be exercised.

Before concluding my remarks, I should like to venture a few words with regard to the future prospects of your property. The results which have so far been obtained cannot be considered otherwise than promising.

Your area is still practically unexplored, and its ultimate value unknown except in so far as the results of the working of Springs Mines, Limited, affords us information. The property of Springs Mines extends the whole length of your eastern boundary, and the results obtained by that company are so good that we may reasonably expect that some of its rich shoots will extend into your ground. I sincerely hope, therefore, that at the next annual meeting I shall save a much brighter and more promising report to make to you



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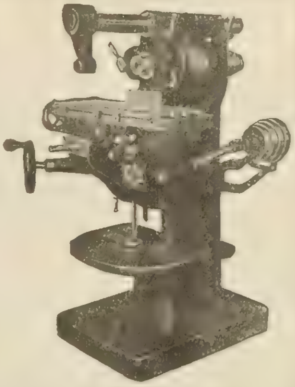

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Determining Dust in Air.

In connection with the improvement of conditions relating to the health of workers in the mining and metallurgical industries, the United States Bureau of Mines has co-operated with the Public Health Service in determining the amount of injurious dust suspended in the atmosphere, and the results of the investigations are communicated to the *Journal of Industrial Hygiene* (U.S.) for September by S. H. Katz, E. S. Longfellow, and A. C. Fieldner, of the U.S. Bureau of Mines. The efficiency of the Palmer dust sampler was determined by the use of tobacco smoke and of silica dust. Two methods of testing were used. The first determined efficiency on the basis of the surface of the particles entering the apparatus as compared with the surface leaving, by the use of the Tyndall effect. The second method, based on the weight of dust, used a small laboratory Cottrell precipitator in series with the Palmer washer. The tests showed: (1) that the Palmer dust sampler retained about 45 per cent. by weight of air-floated silica dust when air was passed through it at the rate of 4 cu. ft. per minute; (2) the surface efficiency with silica dust, measured by the Tyndall effect, was 30 per cent. when the air passed at a rate of 4 cu. ft. per minute, and 20 per cent. at 3 cu. ft. per minute; at 5 cu. ft. per minute, water was carried mechanically from the washer; (3) the efficiency based on number of the silica dust particles is probably lower than the surface efficiency; (4) the Palmer apparatus was less than 13 per cent. efficient in retaining tobacco smoke, as measured by the Tyndall effect. Assuming tobacco smoke particles to be of uniform size, the optical efficiency of less than 13 per cent. should also apply to weight and number efficiency.

* * * *

A New Use for Radium.

Some interesting details respecting the supply of radium at the disposal of different countries of Europe and of the world at large are given in an article of the "Berliner Tageblatt," which at the same time narrates a curious history of certain dealings in radium in Germany during the war. After referring to the report of the new discovery of radium in Madagascar, where it has been found in a new mineral called betafit, and is said to be therein contained to a larger extent than in any other form, the article proceeds: "The world supply of pure radium is not exactly known, for it is distributed in tiny parts of grammes, milligrammes and fractions of milligrammes, over countless clinics, scientific laboratories, and industrial works throughout the world. Statistics which have some claim to accuracy speak, however, of 100 grammes. The larger part—namely, 60 grammes—is in America, the chief productive soil for radium. The Memorial Hospital in New York possesses the tremendous amount of 4 grammes. In Europe there are two centres of the highest radium standard—Vienna, which preserves 2 grammes at the Academy of Sciences, and Paris, which, since Christmas, has concealed the like amount in the cellar of the Radium Institute, conducted by Madame Curie. In order to curb the fiery forces of these two grammes, they are let into a great hollowed stone, which is, moreover, clothed in a mantle of lead 30 centimetres thick. This repository of radium is said to resemble an image of Buddha. It is kept in a walled-in safe, which is closed by a heavy iron door. Germany is in a peculiar position. It played a great part in radium research, and possesses in Berlin, Heidelberg and other University towns admirably conducted radium institutes. Nowhere however, has it an undivided quantum equal to that in Vienna or Paris. The total weight of the fractions of radium distributed among the Berlin clinics and institutes has never been actually established, but it is estimated at only 1 gramme. This quantity, and such supplies as otherwise exist in Germany, are amply sufficient for healing purposes. It is, however, noteworthy that, during the war, and in the time after the war, the stock of radium in Germany was greatly lessened, and the loss has not yet been made up. What was done was done in secret, and belongs to those things which cannot be plainly proved; but in adept circles it is regarded as certain that in the form of radium, whole fortunes were conveyed abroad and concealed within the frontiers.

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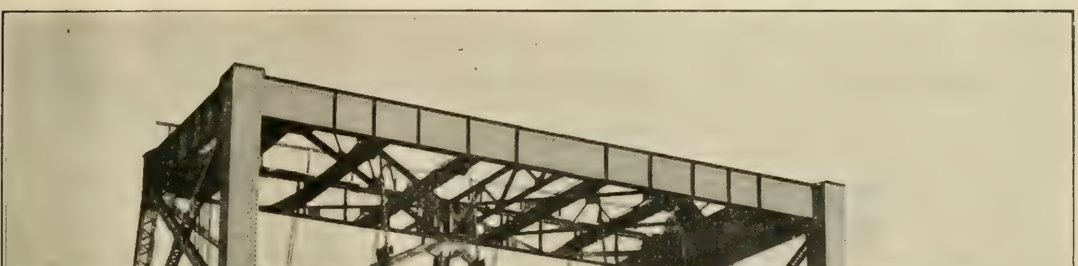

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The Reform of the Union Mining Law.

The following interesting contribution to the discussion on Mr. C. J. Gray's paper on the ideal mining law, read before the C. M. & M. Society, was made by Mr. W. A. Hirst at the last meeting of the Society. Mr. Hirst was lately a Mining Commissioner, stationed fourteen years in Barberton and two years in Boksburg. His views are therefore of more than ordinary importance.

Mr. Gray's remark that " an ideal mining law is unobtainable " is very true, but the writer considers that the Transvaal law is satisfactory in many ways. There are, it is true, many unsatisfactory features, some of which will be referred to hereafter. Title is good and the registration in the Johannesburg and district offices can be relied upon. The information in the district offices is more up-to-date because in the Johannesburg office only surveyed rights are registered, whereas in the district offices the compilation plans show all peggings which have not been surveyed in addition to those which have. Transfer of rights must be by deed and is easily effected at a moderate expense. In the Transvaal the districts are classed " A " and " B." " A " the Reef districts and " B " the outside districts. In the former, rights to be transferred must be surveyed, but in the later the Mining Commissioner may allow transfer on a sketch plan approved of by him.

Mr. T. G. Trevor's Views.

Mr. T. G. Trevor, in the April, 1920, number of the *Chemical, Metallurgical and Mining Journal* deals at length with the subject of obstacles to mining, and the writer heartily agrees with his views. To thoroughly appreciate the position to-day it may be stated that from a prospecting and mining point of view, land is held as follows:

(a) Private unproclaimed land;
(b) Private proclaimed land;
(c) Government proclaimed land;
(d) Government unproclaimed and deproclaimed land.

The " obstacle to mining " applies, principally, to (a) private unproclaimed land. Here the Government, although satisfied from the reports of its officials that certain farms are mineralised, cannot touch them if the owner objects and proves that for three months in the year his farm has been used for agricultural or pastoral purposes—a very easy thing to do. To alter the position on the lines indicated by Mr. Trevor, a sweeping alteration of the law would be necessary, and this alteration is, in the writer's opinion, impossible to-day in view of the strength of the various political parties, because it must be borne in mind that the back veld farmer and the capitalists are equally affected. Until something of the sort is done the mineral resources of this Province will never be proved. In the cases of (b) (c) and (d) the operations of the prospector are not hampered to any unreasonable degree. The land is already available for prospecting, and if it is not, the Mines Department will do all it can to make it so.

Discovery Rights.

There is one point in connection with prospecting which the writer would like to lay some stress upon, and that is in connection with discovery rights. Discoverer gets every possible encouragement and assistance from the Mines Department, but he can only get one claim (every claim being 400 ft. by 150 ft.) for every sixty morgen of the area of the farm or lot (with a maximum of 50 in all). His award is notified in the " Gazette " and the notice informs the public that no further prospecting is to take place on that farm or lot. Here is the " obstacle " which certainly ought not to exist. The writer has in mind two cases in his late district where the prospectors have been granted discovery rights, one for precious and the other for base metals. Their operations extended over a considerable distance outside the claims selected, as the oward and values were proved equally good all along, but, as the law says that no further prospecting is to take place, meaning, of course, that no further awards can be granted, that (possibly) valuable mineralised area is locked up unless the Government decides to proclaim, in which case the prospector who has done all the work and borne all the expense has to compete with the public for the ground he has proved.

The prospector as the first step obtains a prospecting permit (5s. per annum) which permits him to peg an area 2,000 ft. by 2,000 ft. (66 2-3 claims). As he is not certain where he will make the discovery for which he will later on claim, he obtains a number of other permits in borrowed names and pegs what he considers every likely spot. Once he has selected his ground the other permits are useless.

A Base Metal Anomaly.

With regard to base metal discovery rights there is a curious anomaly which should be remedied. The intention of the law is to duplicate matters relating to base metals. One can peg 100 claims as against 50 gold, yet, when it comes to making a discovery award the maximum is 50 as it is for gold. An oversight, of course.

Mr. Gray deals at some length with the holding of ground for speculative purposes. This is a very difficult point. Under the Transvaal law there are two methods of forcing or endeavouring to force a claim-holder to work his ground (a) raising his licence money to 15s. per claim per

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mensom as against the 2s. 6d. he has been paying, and (b) giving him notice to work, and, on non-compliance, forfeiture follows. Neither of these is satisfactory, becouse in (1) he has no need to work it he pays the increased rate, and, if the rate is once raised, it cannot be reduced even though the claim owner subsequently begins to work; and as to (2) because it is too cumbersome. It would take, the writer estimates, anywhere from 8 to 12 months to reach the forfeiture stage. Whether or not it is wise to forfeit is a very open question. As regards the Transvaal the writer is not in favour of forfeiture for non-work, for many reasons which it is not within the scope of this paper to deal with.

Base Metals or Gold.

Under the heading of "Control of Mining," Mr. Gray touches on the subject of the pegging of base metal claims over what is considered gold reef. This is so, and unless the law is altered it cannot be prevented. The writer knows of cases where a claim holder has paid on his claims for years at the gold rate of 2s. 6d. per mensum, has allowed the ground to lapse, taken his chance of repegging, has repegged as base metal, and then paid his 1d. per claim for 12 months, and sixpence per claim afterwards. The remedy is for the Government Mining Engineer to have the property thoroughly sampled, and, if satisfied, report that it is a gold proposition, not base metal. Thereupon the Department will call for licence money at gold rate. To the writer's knowledge, this procedure has never been adopted, and, in his opinion, never will be. Claim owners have told him that they would welcome such a report with glee, as it would be a Government guarantee as to the value of their property.

Administration of the Law.

As regards the administration of the law I can truthfully say from my long experience that it is extremely satisfactory and business is conducted as expeditiously as circumstances permit. Each district is to a very great extent decentralised, and for all ordinary work the man on the spot can, and does, deal with it without delay. There are many other features of the Transvaal Gold Law which it might be of interest to comment upon, but, as they refer mostly to details such as surface rights, stands, etc., they are scarcely relevant to this paper, but I may say that as far as outside districts are concerned the Mining Commissioner, having a fairly free hand generally, does his best to smoothe the path of the prospector, and he usually succeeds. This paper is scarcely on the lines of what an ideal mining law should be: it rather takes the form of an uncomplimentary comment. Still, if the points raised were satisfactorily remedied, they would go some way, at all events, towards the "ideal."

Cape Diamond Returns for March.

The output of diamonds from the public diggings in the Cape Province for the month of March is as follows (the number of claimholders in the Barkly West District being given as 1,273):—

BARKLY WEST DISTRICT (2,642¾ carats value £15,279 5s. 6d.).

	Carats.	Value. £
Blaauwbank	13	43
Delport's Hope	69¼	363
Forlorn Hope	32½	167
Gong Gong	233¼	1456
Good Hope	240	1158
Harrisdale	168¾	940
Hebron	221	1375
Holpan	84½	417
Jonas Kopje	36¾	146
Kareepan	69	447
Keiskama	14¾	43
Klipdam	148¼	857
Klipdrift	185¾	831
Longlands	434¾	3209
Niekerk's Rush	118	672
Rickett's Prospect	56¼	210
Rosalind	3	9
Scholtz's Prospect	33	116
Snyder's Rush	64½	306
Van Zoelen's Laagte	6	15
Waldeck's Plant	271½	1650
Ward's Hope	22¾	167
Winter's Rush	116¼	673

HERBERT DISTRICT (74½ carats value £397 17s. 6d.)

		£
Brypaal	44¾	202
Davisdrift	5	15
Douglas Kopjes	5¾	82
Mosesberg	5½	9
Platdrift	2¾	45
Schmidt's Drift	9¾	43
Sevonelles	1	1

KIMBERLEY DISTRICT (362½ carats value £2,745 12s. 6d.)

		£
Robinson's Kopje	192¼	1342
Wedberg	170¼	1403

TAUNGS DISTRICT (119¾ carats value £506 17s. 6d.).

		£
Doyle's Prospect	38½	114
Home Rule	74½	372
Killarney	6¾	20

PRIVATE ESTATES.

		£
Amantia	108¼	1163
New Vaal River D. and E. Syndicate	375¼	1669
Pniel Estate	310¾	1633
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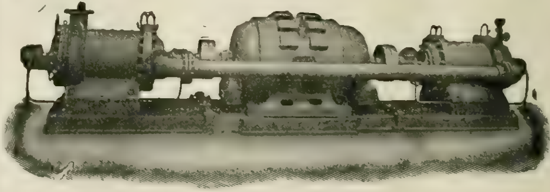

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The E.R.P.M.: Technical Experts' Views.

POINTS FROM THE MAJORITY AND MINORITY REPORTS OF THE GOVERNMENT COMMITTEE OF INQUIRY.

The following is a brief summary of the important reports issued by the Government Committee of Inquiry on the E.R.P.M. That Committee was composed of well-known Rand mining engineers and their conclusions are given below and also referred to by Sir H. Ross Skinner in the report of the E.R.P.M. meeting.

The report, together with a minority report, of the Committee appointed by the Government to inquire into the possibility of the closing of the East Rand Proprietary Mines, Ltd., has been issued.

The report was signed by the Chairman (Mr. C. E. Hutton) and Messrs. C. K. Thomas, Errol Hay and F. H. P. Creswell, the latter's signature being subject to two memoranda issued by him. Messrs. Wilkinson, Brett and Meyer did not concur, and submitted a minority report.

The terms of reference included inquiry into any practical measures which might be adopted to prevent or delay the closing, to consider the effect on the working of the neighbouring mines, and the possibility of arranging contributions towards the cost of carrying out pumping operations in the East Rand Proprietary Mines by the owners of neighbouring mines.

The majority report details the extent and nature of the E.R.P. Mines, the property comprising 4,412 claims, the working being about 3.8 miles on the strike of the reef and 1.3 miles on the incline.

An examination of tables attached to the reports gives the following result: (1) A gradual fall in yield per ton from 32s. 1d. in 1912 to 23s. in 1920, and to 21s. 11d. in March of this year; (2) an increase in working costs from actually 19s. 5.4d. per ton milled (a development redemption charge of 3s. per ton was made in 1912 and actually only 1s. 7.4d. was spent) in 1912 to 27s. 7d. in 1920. In 1912 some 1,020,106 tons of payable ore averaging 8.2 dwts. were exposed, while in 1920 only 424,470 payable tons averaging 7.3 dwts. were exposed.

Closing Down Prospects.

It appears probable, states the majority report, that the quantity and value of the available ore reserves of the E.R.P.M. under present conditions and the curtailment of development will preclude the continuance of operations by the mine, as at present constituted, after the expiration of approximately nine months from date. It also appears from the large amount of development which has been carried out in promising areas without success, that the probability of developing a quantity of payable ore within the boundaries of their own property to maintain the ore reserves, while milling at full capacity, is remote, although at the extreme east and extreme west, in the lower portion of the mine, the prospects for future development are more favourable.

The Committee concluded that owing to the vast extent of the property, necessitating the maintenance of so many shafts, the abnormal quantity of water which has to be dealt with and other reasons, it would not be possible to effect such economies as would materially reduce the costs.

"There is little opportunity," it is added, "for selective mining. Any increase that might be obtained in the recovery per ton milled by this means would be more than set off by the increase in the costs per ton milled on account of the standing charges having to be distributed over the smaller tonnage."

The question is discussed as to whether the acquisition of other contiguous properties would be likely so to add to the amount of payable ore as to permit work under present conditions for an appreciably longer period.

The report gives the opinion that even if such relief could be obtained it would be merely temporary. Within a short time the mine must inevitably close, since it is improbable that within a short period working conditions will have improved to an extent enabling operations to be continued permanently.

To "Tide Over."

"It is obviously desirable," says the report, "if it can be managed, that the mine should be tided over the present emergency not only temporarily, but also permanently."

The report proceeds to discuss a fourth proposal in regard to the prevention or delay in the closing. This is as to whether the acquisition of portions of the property by the Witwatersrand Deep, Ltd., on the western boundary and amalgamation with, or purchase of, the Cinderella Consolidated on the eastern, would lead to a beneficial reconstitution of the district. Whether it would hold out reasonable prospects of the mining and accessibility of the whole area being saved.

The report goes exhaustively into this aspect of the case, and is of the opinion that if an arrangement on lines set forth can be come to "it presents an opportunity of prolonging the life of the long stretch of mines."

The effect upon neighbouring mines of the closing of the E.R.P.M. will not be immediate, proceeds the report. Within about seven months from the cessation of pumping, however, water would flow into the Witwatersrand Deep workings. Four other neighbouring mines would subsequently be affected if pumping measures were not taken.

The lives of the mines, other than the Witwatersrand Deep, from the time when they would be affected by the water, were so short, the report observes, that they would not be likely to consider any contribution towards pumping costs.

Minority Report.

The minority report considers very closely the present position of the mines. It observes that a moderate percentage of payability is now practically limited to the extreme west and east, and that there are not sufficient places for development to maintain the reserves. At the present rate of milling, say, 130,000 to 140,000 tons per month, mining operations must gradually be restricted until losses are made owing to the small tonnage mined, consequent on the decrease in the number and linear extent of stoping faces.

"The possibility of the E.R.P.M. incurring heavy losses, and, therefore, being closed," it is stated, "is very great if for no other reasons than the continued fall in value and percentage of payability in depth, the additional expenses consequent on mining at increased depths, and the gradual exhaustion of the ore reserves.

"Assuming the continuation of the present prices of stores, labour and gold, it is probable that by the end of this year the quantity and grade of the reserves will be so low as to cause mining and milling operations to result in considerable losses."

The various suggestions made are gone into minutely. The question is brought forward whether a reduction in working costs could be brought about, which would enable the company to avoid losses and, by lowering the pay limit, create a considerable increase in the ore reserves.

"The usual method adopted to make any enterprise pay its way is to economise, and is probably a better plan than tacking an enterprise which is non-paying on to another of doubtful value," it is remarked.

"It is questionable if there will be an improvement in depth in this district. At any rate, such an improvement has not yet been discovered in the deep levels stretching from the Jupiter to the Witwatersrand.

"A reduction in working costs is vital and probably the only way in which these deep level mines can be made to pay."

The first suggestion offered is a reduction in white wages. In this connection the report proceeds:

"The average rate of pay per white employee on the property during 1912 was £335 per annum, and during 1920 was £506—an increase of £171 per employee, or a total increase on 1,435 employees of £245,385.

"If white wages were reduced by half of the above increase, it would represent a decrease in expenditure of £120,000 per annum, and an average decrease in pay per white employee of £85 10s. per annum, or about £7 per month, the resulting average pay per annum being £418.

"At the present time enormous sums are paid yearly by the mines as diggers' licences on claims that are supposed to be worked for gold. There are thousands of these claims on the Rand that are completely exhausted, and on which the mining companies continue to pay £12 per annum per claim.

"In the East Rand Proprietary Mines some 1,340 diggers' claims are paid for in this manner. It is suggested that these should be paid for as prospectors' claims, at the rate of £3 per annum. This decrease would save the East Rand Proprietary Mines some £12,060 per annum.

"It is probable that the costs of stores will decrease considerably during the remainder of this year and next year.

"It is probable," adds the report, "that some amelioration of conditions could be provided by a decrease in Customs dues and railway charges.

"The above three suggestions are made as ways in which costs could be lowered, and as being probably the most practical methods that could be adopted to prevent or delay the closing down of this large property and many others.

"Assuming a saving of only 1s. per ton by a decrease in the cost of stores, a total saving of, at least, £200,000 per annum could be effected on this property by the adoption of the above suggestions."

The report quotes statistics emphasising the importance of the mine to the surrounding district, and says that it will be clearly seen that it is the Government itself which has the greatest financial interest in the continuation of the operations of these mines.

"We are of the opinion that if the East Rand Proprietary Mines were guaranteed against loss to the extent of their pumping charges, which they have now carried for many years, it might be of considerable assistance to them in enabling them to prosecute further exploration for payable ore and possibly enable them to extend their life for some further period."

The Railway Earnings.

The South African railway earnings for the week ended May 7th show another big decrease, the total receipts amounting to £395,447 as against a weekly estimate of £435,202—a shortfall of £39,755. The receipts from passenger traffic show an improvement to the extent of £19,255 and miscellaneous revenue an increase of £4,295, but every other class of traffic shows a marked decline, the largest decreases being those recorded by coal traffic (£34,111) and goods traffic (£25,099). The total receipts for the period April 1st to May 7th this year are returned at £2,228,861, which is £86,006 below the estimate for that period.

ZAAIPLAATS TIN: LATEST RESULTS.

For the quarter ended April 30th, the Zaaiplaats directors report as follows:—

The mill ran 41.4 days (15 stamp—24 hour basis) on 87 days, crushing 1,348 short tons, the duty per stamp being 3.25 tons per 24 hours. The output for the quarter amounted to 23 long tons of concentrates, assaying 60.7 per cent. metallic tin. The results for the quarter show an estimated loss of £7,848 18s. 7d. before providing the directors' fees and Government taxes. Fourteen and a half long tons of metallic tin was produced by the smelter. Owing to cost of, and losses in smelting, the smelter has been closed down and shipping of concentrates to the Straits Trading Company will be resumed. Owing to a further decline in the price of tin during the quarter, it has been found necessary to effect even more drastic economies than were foreshadowed in the January report, and all mining was suspended on 17th March. It is intended to resume mining at the lease and such other workings as hold out the best prospects at the earliest possible date. Meanwhile mine sweeping and reclamation is proceeding at No. 13, and it is anticipated a considerable tonnage of payable ore will be recovered from this and other workings, and old ore dumps, etc. Moreover, by improved classification and re-arrangements and adjustments in the reduction plant, the large accumulations of sands and residues can be profitably treated, and it is from these two sources principally that the company's production will be derived until the resumption of mining. During the quarter operations were commenced in the valley on the farm Roodepoort, about 500 yards below the Zaaiplaats mill, and the yield here was distinctly satisfactory, but with the reduced scheme of working and small amount of labour available for this work it has been suspended for the present. The number of natives in the employ of the company at the end of the quarter was 143. The rainfall for the quarter amounted to 11.81 inches. Owing to the reduction in the Zaaiplaats scale of operations, mining at Stavoren has been suspended and work restricted to surface prospecting on certain promising indications on the quartzite-granophyre contact. During the quarter, owing to shortage of water the mill ran intermittently, producing 5½ long tons of concentrates.

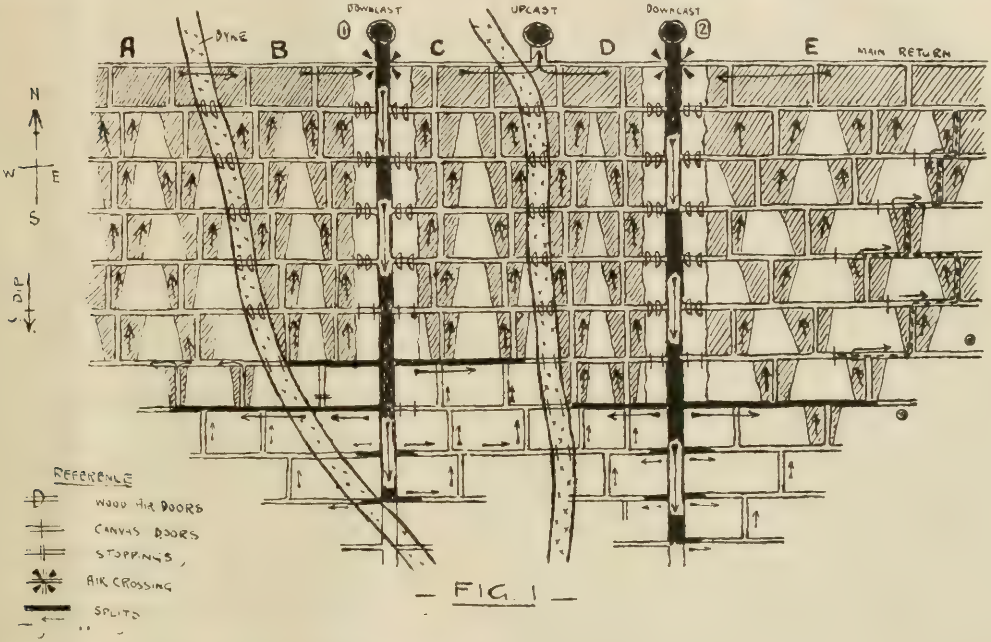
The Beginnings of the "S.A.M.J."

Mr. W. A. Wills, the well-known London director of mining and other companies, writes to us as follows: "Allow me to congratulate you on the thirtieth anniversary of the journal. I must say I felt a little hurt in reading your "history" of the *South African Mining Journal* in its issue of March 19th, to notice that the name of the original founder, proprietor, editor, publisher and bottle-washer was omitted. I thought you were aware of the identity of the individual filling those important rôles. His name was W. A. Wills. At the outset, I had two partners with a small sleeping interest in the paper, viz., Mr. Frank Dickson, brother of my old friend, "Lord George" (who has now left his earthly troubles behind), and Mr. Hugh Paynter. After the first issue, however, I agreed with Mr. E. P. Rathbone to absorb him and his monthly paper (*The Mining and Metallurgical Journal*) and between us we bought out Paynter and Dickson. The paper was, almost from the very outset, strongly supported by all the great houses, particularly the late Mr. Hermann Eckstein and Sir Lionel Phillips. Very shortly afterwards another old friend, Mr. Wilson Fox, joined us as editor, and this was the real foundation of his career. His services on *The Mining Journal* drew the attention of the late Dr. Rutherford Harris and Mr. Rhodes to his unusual abilities, with the result that, with John Hayes Hammond, he drafted the Rhodesian Mining Law. As a later consequence, he went to Rhodesia as Crown Prosecutor, afterwards becoming a director of the Chartered Company and, as you are aware, a very prominent member of the House of Commons. From the first the paper was recognised all over the world as a reputable and trustworthy organ of the great South African mining industries, and I am glad to see the tradition maintained by you."

Practical Points about Mine Ventilation.—IV.

By E. C. RANSON (METALLIFEROUS AND COLLIERY MANAGER'S CERTIFICATES, MINING KING'S MEDALIST).

Dykes or faults are very useful in dividing a mine up into sections or districts; on most mines one can make use of these natural barriers to lay out well-defined ventilation sights. Fig. I. gives a rough idea as to how they can be so utilised.



— FIG. 1 —

Three shafts are shown, two downcasts, and one upcast. Leading from each downcast shaft to the dip is the main intake, which may be an inclined shaft, or with a relatively flat reef, a haulage road. From No. 1 downcast there are three main splits, two on the west side, ventilating either side of the dyke, and one on the east ventilating the west side of the dye shown. From No. 2 downcast there are two splits, as shown. The air from all these splits feeds into the same main return, through which it passes to the upcast shaft.

The drives on either side of the main intake, where there is any traffic, should be double doored, a single door in a drive leading from a main intake is very little good at all, every effort should be made to keep the intake column solid. In abandoned drives the doors may be replaced by permanent stoppings of brickwork or rock.

It is important that these wood doors should be well built; there is no reason at all why they should not be perfectly airtight. They, of course, should be so hung that they close by their own weight. Where doors are subject to great pressure, as, for instance, the main dividing doors between the fan and the intake, it is advisable to give them additional strength, as shown in fig. 2. Instead of the door frame abutting the brickwork, it is let into it, giving additional strength to the door by preventing the frame being knocked out of place.

We have now carried our air up to the point of the split without much difficulty. It is when the air enters the split that one has to exercise skill in so coursing it that the far-off places receive as much benefit as the near places. Air in a mine will always find the shortest road home; to prevent this it is necessary to occasionally put in "bearing up" doors of canvas to "breast" the air up to the boun-

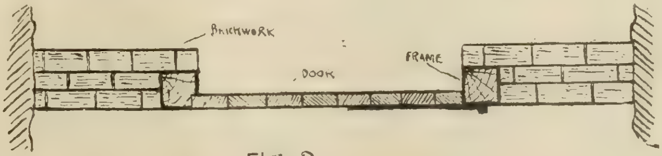
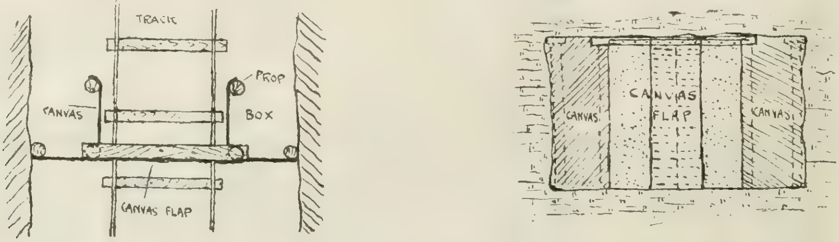


FIG 2

PLAN OF WOOD AIR DOOR

dary places. Exactly what I mean is shown in fig. 1. In the split "E" I have shown five canvas doors, which breast the air up to the boundary, as shown by the dotted line, instead of travelling up to the main return by the nearest route. The drives through the dykes are, of course, closed off, too, either by wood doors, or if the pressure is not too great, by canvas doors.

A door of brattice canvas is often brought into use in ventilating a mine, and like everything else, has to be properly built. A wood frame with a canvas flap does not constitute a door. The correct thing is the box door, as shown in fig. 3.



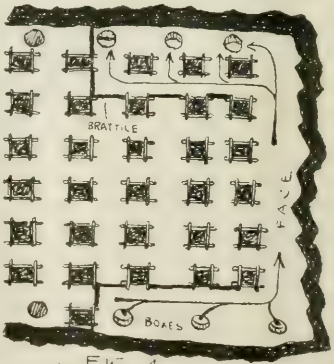
PLAN OF CANVAS BOX DOOR – — ELEVATION —

– FIG. 3 –

A couple of props and a headtree are set just wide enough to allow the cars to pass through. From the headtree is hung the canvas flap, which is in three parts; it consists of two pieces of canvas which meet in the centre, and over the joint is hung a covering piece. By having the flap in parts like this, it is not torn by the passing of the cars to and fro. By setting other two props on either side of the track, as shown in the sketch, and running brattice canvas from one to the other, we form a canvas box on either side of the track, as shown in the sketch, and running brattice canvas from one to the other, we form a canvas box on either side of the track. The idea of the box is to prevent as much leakage as possible, either when the door is blown open by the air current, or pushed open by the cars or other traffic; any blowing open of the flap is covered by the sides of the canvas box.

Very often lots of air is wasted by allowing it to traverse "dead" ground in the shape of developed, unpayable blocks. All such places should be closed off by suitable stoppings (brattice canvas also bting useful here), and the air carried to places where it is needed.

We have now got our air into the required stopes, through which it will eventually pass to the main return. In the stopes themselves improvement can be made; we can still do a little coursing, and carry the air current up the face, where it is required. The area of a stope through time becomes very vast, and though a fair quantity of air may be passing through, it is spread over such a large area that a current is not perceptible on the face. If the area of windway in such a stage was reduced to something resembling drive dimensions, it would make all the difference between a well ventilated working and one which is dead. Whether development is on or under the reef, by bratticing between solid pigstys and closing up boxholes where required (fig. 4) the air may be so controlled in the stope that the whole of it passes up the face in a well-defined path.



– FIG 4 –

In conclusion, I might say that, to carry out the work of ventilating a mine satisfactorily, and keep it so, it should be under the direction of one man, who knows what is happening to the air throughout the mine and who is competent to do the work. He should have labour at his disposal and personally supervise any work that requires doing. It is work distinct from anything else going on in the mine, and should not be depending on other officials to get it done. After the air has left the last working place, he ought to be responsible for the upkeep of all windways until it finally leaves the mine. At the present time, when a drive is worked out, it is left more or less to its own resources, and even though it may be an important windway return for the district, it is neglected, until finally it is impossible to travel it. Such official ought to have a status similar to a "master wasteman" at home; his job is "air," and next to the underground manager he is the most important official in the pit.

MINES DEPT. EXAMS., 1920.
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SURVEYOR'S CERTIFICATES — March, July and Octobe. (Extra) Exams 100 %, 50 % and 60 % respectively of S A. total
MANAGER'S CERTIFICATES. — Two last Exams. (Sept., Jan.) 17 out of total 28 in S.A
OVERSEER'S CERTIFICATES.—Two thirds of the S.A. total for year 1920 75 % for January, February, March, 1921.
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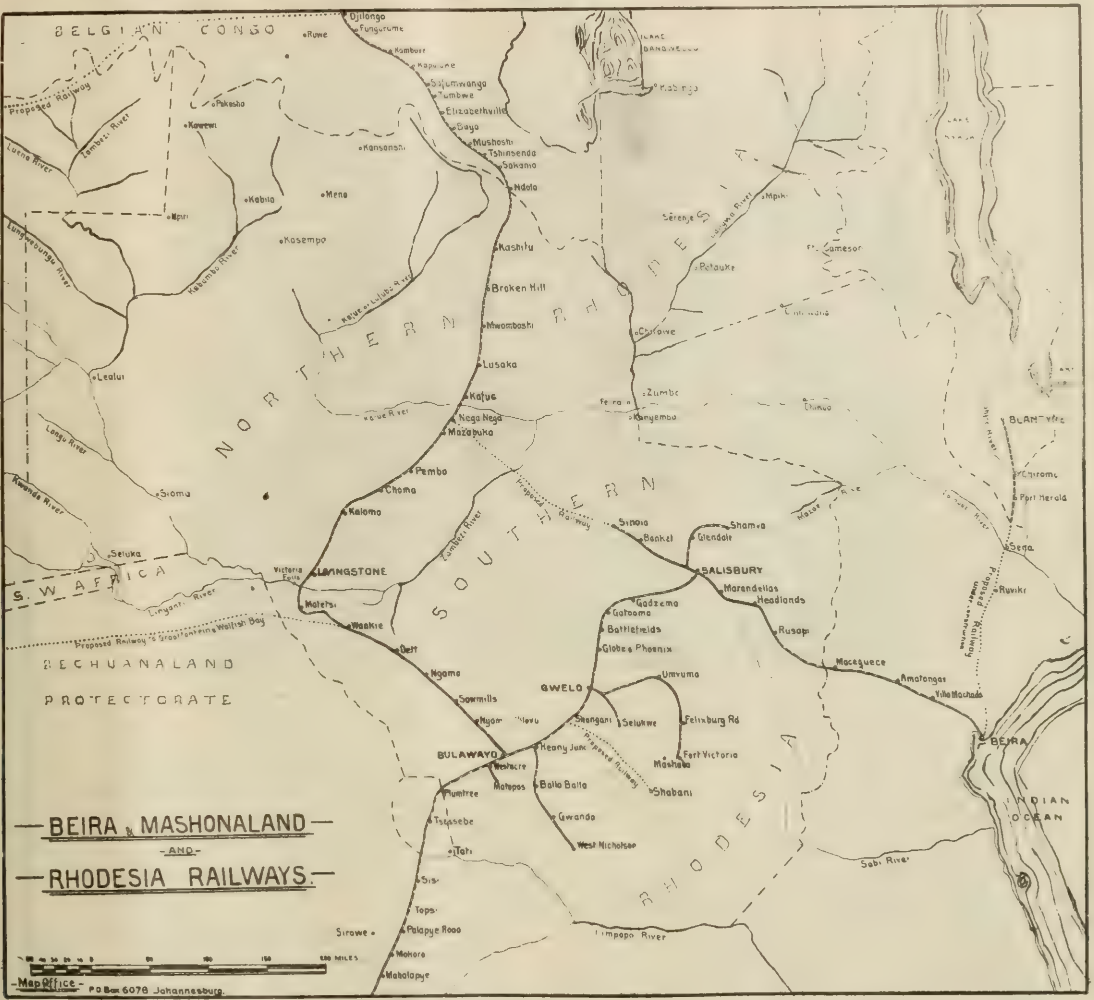
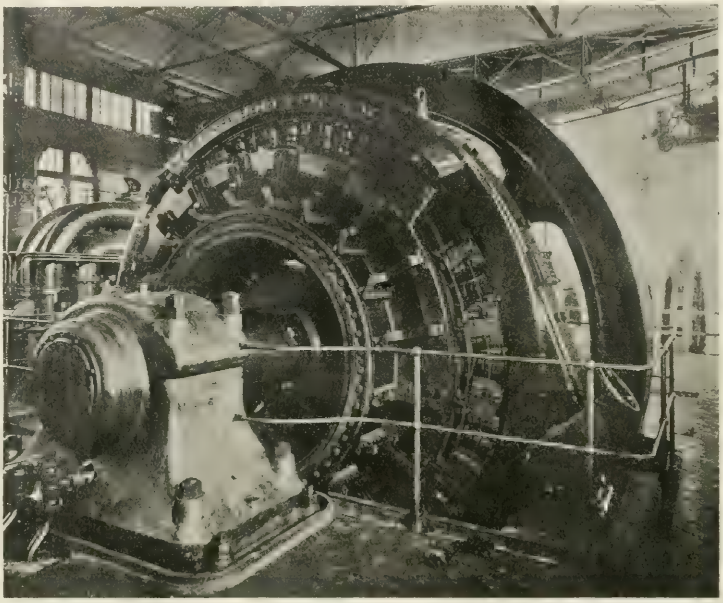


A recent Railway Map of Rhodesia, the Southern Congo, and Mozambique. The New Governor-General of the Congo, His Excellency M. Lippens, contemplates a big extension of the railway system of the territory.

Iron and Steel: A Reply to Mr. Blenkinsop.

Recently Mr. G. H. Blenkinsop contributed to our pages an interesting article on the future of iron and steel in this country. It was certainly pessimistic, but we printed it in order to be fair to all sides. We now note that Mr. A. D. Owen, London secretary of the Union Steel Corporation, writes to a London contemporary as follows:—"In your issue of April 1 you quote from an article by Mr. G. H. Blenkinsop in *The South African Mining and Engineering Journal* what purports to be evidence against the possibility of establishing a large iron and steel industry in South Africa. Since the statements of the writer are not in accord with the views of others interested in the iron and steel industry who have visited South Africa, and among them experts of the highest reputation in this country, I should be glad if you would allow me to correct what, in my opinion, is erroneous. The criticism in question can be reduced to three assertions, namely: (1) That not all the South African iron ore is suitable for making steel by the acid process; (2) that the quantity of coking coal in the Union is so limited that the erection of blast furnaces for the manufacture of iron is not justified; (3) that the Union does not contain a large quantity of limestone in close proximity to the localities where iron smelting would take place. I will deal with these *seriatim*. No claim has ever been made that the whole of the Transvaal ores are suitable for making steel by the acid process. Undoubtedly, high-grade low-phosphorus ores exist (at Kromdraai and elsewhere) which would be eminently suitable for the manufacture of hematite pig; but it is not proposed to make acid steel, and these ores would be used in admixture with phosphoric ores (of which there is an abundant supply) for making basic pig for the manufacture of steel by the basic process. Nor is it proposed to make use of the titaniferous ores to which the writer refers, as there are abundant ores available from which titanium is absent. Recent investigations into the coking qualities of Witbank coals have shown that there is a reasonable expectation of obtaining from that field a good supply of coke suitable for metallurgical operations, while in the Vryheid district good metallurgical coke is now being produced on a commercial scale. As to limestone flux, dolomite containing 50 per cent. of pure flux, and therefore quite suitable for blast-furnace work, is obtainable in close proximity to either of the sites where it has been proposed to erect blast furnaces."

GEC° TRADE MARK



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Letters to the Editor.

THE DISTRESS IN THE MINING AREA OF CORNWALL.

An Appeal to Cornish Folk Across the Seas.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—The late Lord Courtney of Penwith, who has been termed " the most eminent Cornishman of his generation," in his presidential address to the Royal Institution of Cornwall in 1897, computed that between the years 1851 and 1891, no less than 170,759 persons emigrated from Cornwall to other spheres within the Empire to seek work and the support that it brings. Undoubtedly since 1897 many thousands have gone outward. To you, " one and all," I make my appeal for help to the broken and sad at Home.

You have severally left the land of your birth, and are, we trust, in better circumstances, in other moods, and with some comfort and courage to face the tasks of your daily life.

The mining industries which have made your present positions and experiences possible are heavily handicapped, the old home industries are in a state of collapse. Until the price of tin is higher, and the prices of working material lower, there can be no revival of prosperity. The closing of these industries means the extinction of a community.

If you could imagine yourselves in the old towns of Camborne and Redruth, and look to the north or south, the arrested toil would both pain and surprise you. Only here and there an engine works, and that only to keep the mine from being flooded.

At the present moment every " Bal " in the old county stands idle! These are terrible facts, and require some courage to state them. It is not always pleasant to tell grim truths. What does this state of collapse mean? It means no work. No work means no money; no money means " the wolf at the door." We know now something of its meaning. I have not the nerve to tell of this " shortness of things "—the " sorrow of evening time," or the sadness of facing a new day that may bring a dole, a favour, or a friend. That the place which has made your present and future possible is so overshadowed, and that the folk who nursed you in it are becoming destitute, is too sad for words.

We have friends, we have courageous and generous local men, but what are these among so many where the needs grow deeper and wider every day?

To think of the men who taught us to use our hands and brains now in the grim grip of distress, makes the heart sick and the soul faint.

It is something more than a Government grant that we need; we need a saving change in our local industrial circumstances. You are severally in wealth producing centres. It is given to you to open up new tracts of country, and develop mining in all its branches on new lines. From time to time you gather and talk of the old sires whose dust sleeps in the Churchyards at Home. The vision of the old town lingers in the evening hour. Just pause a moment and say, " Well, Dolcoath—one of the oldest bals in the world—and here's my mite."

It is to you, brother Cornishman, wherever and however these lines find you, that I am making this friendly appeal. You have had the courage and means to go forward; you have dared the seas, and passed your days and nights in far away lands; you have faced the swamps and the mountains on the outposts of Empire. No difficulties arrested your energies, but just challenged them. We are proud of you, and therefore I am writing this note as a letter to each man Cornish born.

We have heard the old men say that there was no sadder sight than an old " knocked bal "—what you would say if you saw them all quiet is better imagined than stated.

The new economic conditions have hit us hard. The silence that is around us is like the silence that precedes the Last Watch. The men who were formerly eloquent are dumb; the brave men of yesterday have lost heart. We are passing each other in the streets in silence—we dare not say how we are, or how our little ones fare.

The men and women who have nourished the community and have ever been willing to serve and to suffer (and their names are not a few) are thinking and planning how to sustain their neighbours in these new bad times. The dawn comes sadly to the old folk, and the music has died out of the sea. They look across the blue waters as if to say, " Do you hear us calling? Do you hear the call of the streets, of the old houses, the old homes, and the old folk too grey to start life under new skies, and to join their comrades of yore? "

It is a case for relief. To each and all of you across the seas—now is the time to clasp hands, to grip the man who wrought in the same level, the same shop, and the same school.

If you can help, help soon, and cheer the hearts and homes of those who love you, though out of sight, and forget not that " Inasmuch as ye have done it unto one of these, ye have done it unto Me." I am, my brother Cornishman, —Yours, etc.,

JOSEPH COCK,
Chairman of the Central Relief Committee.
Camborne, Cornwall.

ALUMINIUM TRANSMISSION LINES.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—The world's longest transmission lines are of aluminium. Why? Because its employment leads to substantial economy and years of service under severe conditions have demonstrated that it is both a reliable and efficient conductor. We have prepared a booklet dealing with points of interest alike to designer and erector, and we shall be pleased to send it to applicants and to supplement the information contained therein if desired.—Yours faithfully,

H.C.
For the British Aluminium Co., Ltd.
Head office: 109, Queen Victoria Street,
London, E.C.4.
April 13th, 1921.

The Development of the Belgian Congo.

The belief is gaining ground in Belgium that the depression from which some industries of the country are suffering is in no small measure traceable to the economic dependence of the little State on others for supplies (writes a special correspondent of *The Times*). British Colonies and Dominions and the South American republics send her the foodstuffs and the wool she needs; her cotton comes from the New World; the ores for her iron and steel trades are the products of France and Luxemburg. In coal alone of the raw materials that she requires in large quantities is she self-supporting. Yet 90 per cent. of her finished products were wont to find their way abroad, to markets many of which are now closed by reason of the abnormal exchange situation. If Belgium can find a country able to supply her with the raw materials indispensable to her industrial activity and at the same time discover a market for her manufactured wares, she will have solved a problem of manifest importance. Years ago Leopold II. saw the need of his country, and attached to it the territory now known as the Belgian Congo. Until the outbreak of the War the tropical Colony, with its illimitable possibilities, was regarded with some indifference, but a great change has since come over public feeling, and the new Belgian Colonial Minister, M. Louis Franck, reflects the enthusiasm of the party keenest on developments in the Congo. To equip himself for the successful discharge of his duties, he has recently undertaken an extensive tour of the territory under his administration, and his experiences on the spot have convinced him of the wonderful resources waiting to be exploited.

RHODESIAN SECTION.

Rhodesian Base Metal Output.

In his Departmental report for the year 1920, the Secretary for Mines has the following references to the Rhodesian base minerals production during the past year:—

A fair amount of work was completed on chrome properties situated in different parts of the country, but the principal output came from the Selukwe district. There is little doubt that we have large deposits of valuable chrome in the country, but the market for this mineral is not unlimited, and chrome claims situated any distance from a railway are severely handicapped with transport charges.

The chrome output showed an appreciable increase, as 60,269 tons, valued at £245,378, were declared in 1920, as against 35,282 tons, of £142,541 value, in 1919. The Rhodesia Chrome Mines and Rhodesia Metals Syndicate accounted for 88 per cent. of the chrome output, and the balance was made up from smaller producers at Selukwe, and a production of 2,000 tons from chrome properties at Darwendale, Lomagundi district. Unless the demand for chrome ore increases appreciably, there is little doubt that a number of chrome claims which were pegged in previous years for speculative purposes will be allowed to go to forfeiture, as it would not pay the owners to carry out the inspection work which would be necessary to keep them current. A valuable chrome property at Lomagundi changed hands for a large sum of money, and it is hoped that an output will be forthcoming at no distant date.

The asbestos industry was thoroughly sound throughout the year, and the demand for fibre showed no diminution. The road facilities for conveyance of asbestos from the principal producing mines, situated in the Belingwe and Victoria districts, were considerably improved, and the wagons experienced no difficulty in reaching rail-heads during the year. The principal trouble during the latter end of the dry season in the Belingwe district was the limited amount of grass for the large number of oxen employed for transport purposes. It is estimated that about 3,500 oxen were constantly employed to remove the asbestos from the Shabanie fields to Selukwe, a distance of 68 miles, and though arrangements were made to create depots along the road to store grass and other food, the oxen fell off in condition and great difficulty was experienced in transporting the output of asbestos. Large sums of money have been and are being spent at the Shabanie fields on development and plant, and it is essential that more permanent facilities should be created to regularly remove the output. A railway to the fields has therefore been seriously considered, and the route has been surveyed, and it is expected that the work of commencing the laying of a railway line will not be long delayed. A large number of claims were pegged between Shabanie and the village of Belingwe, as slip fibre of good quality was discovered there. Work on these claims has been in progress, but it is yet too early to definitely ascertain the value and size of the deposits.

In dealing with the output and value of asbestos for 1920, it may be mentioned that a large quantity of asbestos of lower grade was sold during the year by one company at Victoria at prices which ranged down to £1 per ton. This asbestos was originally considered to be unsaleable and really is dump asbestos, but it was found that it could be used for trade purposes and accordingly was shipped. This output, however, reduces the output value as compared with previous years. The adjustments on receipt of account sales were also not so heavy as in 1919. These two causes explain the reason why, although the output is much higher, the value does not reach a corresponding figure. For declaration purposes asbestos is valued at between £15 to £25 per ton, subject to adjustment on sales. The output in 1920 shows a considerable increase, as 18,823 tons were declared, of a value of £459,572, as compared with 9,799 tons, valued at £425,240. When the final value figures for 1920 are received the total value for that year will be much higher, as the adjustments will be heavy, and, as has been recorded in a previous report, the 1919 figures were inflated by adjustments extending over two years.

A settlement was arrived at with the tungsten producers by the Imperial Government in regard to the production, which could have been made up to 31st December, 1919, by the payment of a sum of £25,000 as compensation for cancellation of contract, and these terms were accepted by the producers, except one, who is still corresponding with the Imperial Government on the subject, and this matter, which had caused a good deal of feeling, has been satisfactorily settled. Owing to the fall in price of tungstic ores, little or no work was carried out on wolfram claims, but 17 tons were declared, of a value of £1,519.

The mica fields at Lomagundi attracted a good deal of attention, and it is proved that mica of good quality has been discovered. The grading of the mica has improved, and mistakes of the past are being overcome. There is every indication that groups of claims are being acquired by new companies or syndicates, and the industry will be placed on a sounder footing. It may be looked upon as an expanding industry. The output for 1920 was 97 tons, valued at £25,153, as compared with 6 tons, valued at £1,345, in 1919. The mica is declared at £250 per ton, but subject to adjustment on account sales.

Four tons of stream tin from the Victoria district were declared, of a value of £661, and eleven tons of antimony, valued at £219. Inquiries have been made about tin claims, and some work is in progress, but nothing definite as to results can as yet be recorded.

The production of arsenic shows an increase of 195 tons, as the 1919 output was 242 tons, valued at £10,486, whilst the 1920 figures were 437 tons at £16,510. This arsenic continues to be produced from a mine in the Bulawayo district and one in the Umtali district. The Bulawayo arsenic is sold to a firm in the Union for conversion into dip, but the Umtali product is dealt with locally and dip is sold from there and is largely used in Rhodesia.

Alluvial diamond washing was continued on the Somabula fields, but the number of workers is growing smaller and the output is decreasing. During 1920 the number of carats declared was 243 of a value of £1,918.

The output of coal and coke from the Wankie Colliery was not only well sustained but increased, and the demand for coal at Beira for shipping requirements continues to grow in volume. Difficulties in railway truckage and a strike amongst the white employees at the colliery militated against a larger output. With the requirements of the Congo, railways, mines and shipping, the colliery has markets which will always require a large supply of coal and coke, and the consumption by smaller industries and in the towns is also an increasing factor. The colliery is well equipped to meet requirements, and it possesses an unlimited supply of good coal. The figures for 1920 were: Coal raised, 578,192 tons; coal sold, 333,997 tons; coal used for coke, 157,097 tons; coal used for brick kilns, 4,600 tons; and the value declared was £252,220, or a rise in value as compared with 1919 of £63,082.

The Year with the Falcon Mine.

The Falcon report to June 30 last states that the development work carried out during the year amounted to 2,979 ft., making a total footage to that date of 35,416 ft. The ore reserves at June 30, excluding some 52,000 tons of lower-grade ore at the 9th level, were estimated at 609,000 tons, valued as follows:—

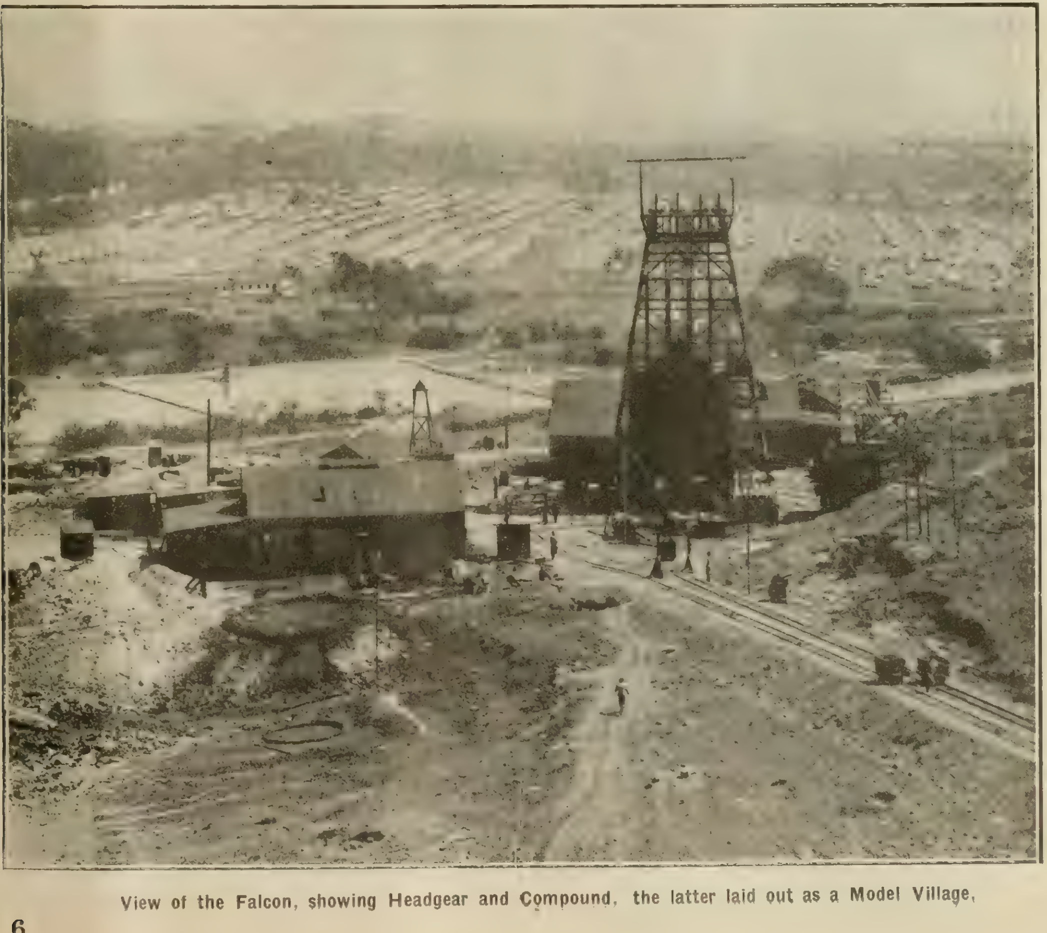
	Value per ton taking gold at 5s. per dwt. and copper at—	
	£50 per short ton.	£60 per short ton.
Gold .... 4.85 dwt. Copper ...... 2.07 per cent.	45s.	49s. 1d.

Of these reserves 362,938 tons have been broken down and are lying in the stopes.

During the year 168,675 tons of ore were treated in the reduction plant, producing 2,762,833 short tons of blister copper estimated to contain—Fine copper, 2,706.33 short tons; fine gold, 30,942.05 oz.; silver, 61,812.78 oz., which have yielded £452,298, equal to 53s. 7½d. per ton of ore treated. Working costs for the year, £346,656, or 41s. 1¼d. per ton of ore treated, leaving a mine profit, exclusive of London expenditure, of £105,642, or 12s. 6¼d. per ton of ore. In addition £2,368 has been earned, principally from treatment of outside ores in the company's smelter. The ore treated showed an increase on the previous year of 17,714 tons, notwithstanding a shutdown during part of the period, owing to a strike of the mine workers, which lasted twenty-one days, but the production, owing to the lower value of ore, has decreased by some 261 tons of copper, 2,655 oz. of gold, and 6,932 oz. of silver. The anticipated improvement in the grade of ore treated has not been realised, owing to the mixture of waste with the ore, and the difficulty, arising from movements of ground, which are still continuing, in drawing on the richer stopes in the upper levels.

The year's operations show a working profit of £104,232, which is reduced, after deduction of interest on debenture stock and loans, income and corporation profits taxes, to £66,759. From this £30,000 is appropriated for debenture stock redemption, and the balance of £36,759 added to £159,908 brought in, gives a total credit of £193,667, which the directors regret they have no alternative, owing to the financial position and the present low prices of metals, but to recommend shall be carried forward. The loan indebtedness at June 30, 1920, stood at £47,500, but at the time of issuing this report (April 22) has been reduced to £5,000. The briquetting process referred to in last year's report is proving successful, but the economy derived from this plant has been more than offset by increased wages, railway, bank, and other charges.

In a supplementary report the operation results for six months to December 31 last are given: Ore treated, 92,188 tons; output fine copper 1,556,494 oz.; gold. 17,604,702 oz.; silver, 35,445,964 oz.; estimated value, taking copper at £65



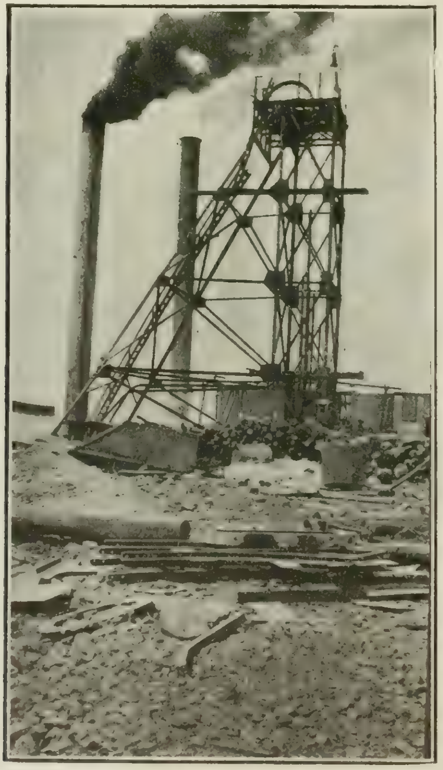
View of the Falcon, showing Headgear and Compound, the latter laid out as a Model Village.

per short ton, gold at 100s. per ounce and silver at 2s. 6d. per ounce, £193,626; working costs (averaging 43s. 7.3 per ton), £201,009; ore reserves at December 31, averaging 4.83 dwt. gold and 2.07 per cent. copper=44s. 10d. per ton, with gold at 5s. per dwt. and copper at £50 per short ton, 515,000 tons.

The directors have frequently pointed out the serious difficulties they have always encountered by reason of the want of working capital. These difficulties have been increased by higher costs, the very serious fall in the price of copper, and the absence of regular shipping facilities, to such an extent that the directors have serious doubts as to the possibility of continuing to finance the company's operations unless the price of copper materially improves. The expenses have been reduced as much as possible, and development work has been suspended, so that it is estimated that under present conditions the value of the output about meets the cost of producing it, leaving no surplus of profit from which to meet liabilities, such as debenture interest and redemption and income-tax in arrear. The sum of about £50,000 will be shortly needed to meet these liabilities, and up to the present the directors have been unable to make any arrangements for the provision of the necessary funds.

LONELY REEF GOLD MINING CO., LTD.

The report for 1920 states that the ore reserves at December 31 last show a slight increase in tonnage, but a decrease in value, being estimated at 202,845 tons, of a value of 20.80 dwt., as compored with 199,739 tons, of a value of 23.54 dwt., on December 31, 1919. Milling operations were carried on continuously. The total tonnage crushed was 59,270, an increase of 3,850 tons; yield, 61,408 oz., a decrease of 7,391 oz.; average recovery per ton crushed, 21.72 dwt.; working costs, 53s. 11.97d. per ton milled, an increase of 4s. 3.17d. per ton, and, including royalty paid to British South Africa Co. (£22,412), 60s. 1d. per ton. The total profit was £178,597, and £58,129 was brought in, making £236,726. Dividends of 50 per cent., less tax, were paid, and there is carried forward £68,729. A considerable sum has now to be provided for capital expenditure on new machinery and plant, and the board has decided, after full experiments, to instal four Crossley gas-producers to replace the steam plant and supply the additional power required. Ample supplies of native timber suitable for fuel for the wood plant are obtainable. The consulting engineer expresses the conviction that a substantial saving in power cost will be effected by the installation of this plant, and that its cost (estimated at about £75,000, including erection) will be redeemed by the savings effected in less than three years.



Rhodesia's Deepest Mine
The Lonely Main Shaft, Nearly 3,000 Feet Deep.

The report of the consulting engineer states that the mine was operated systematically throughout the year. The total footage is 1,291 feet more than in 1919, and 1,439 feet more than in 1918. The incline shaft was extended to 2,703 feet below the 9th level. The 19th level was extended 265 feet from 732 feet to 997 feet south from the main crosscut. The length of ore exposed was 263 feet from 732 feet to 995 feet, averaging 30.5 dwts. over 40.6 inches. The face is in schist. The total length of ore exposed at this level is 1,078 feet, averaging 33.1 dwts. over 42.0 inches. The 20th level was extended 367 feet from 644 feet to 1,011 feet south from the main crosscut. The length of ore exposed was 76 feet from 644 feet to 720 feet, the reef averaging 17.8 dwts. over 18.5 inches. The total length of ore exposed at this level is 640 feet, averaging 40.2 dwts. over 38.3 inches. The 21st level was extended 339 feet from 452 feet to 791 feet south from the main crosscut. The length of ore exposed was 65 feet from 645 feet to 710 feet averaging 8.2 dwts. over 13.2 inches. The total length of ore exposed at this level is 842 feet averaging 27.9 dwts. over 41.1 inches. The 22nd level was extended 315 feet north from 74 feet to 389 feet; and 352 feet south from 95 feet to 447 feet from the main crosscut. The ore exposed in the north drive is 46 feet from 74 feet to 120 feet, averaging 10.5 dwts. over 32.8 inches and 240 feet from 145 feet to 385 feet averaging 12.2 dwts. over 22.8 inches. The ore exposed in the south drive is 260 feet from 95 feet to 355 feet, averaging 28.2 dwts. over 51.8 inches. The total length of ore exposed at this level is 715 feet, averaging 20.7 dwts. over 47.5 inches. The 23rd level was opened up during the year and driven 64 feet north and 166 feet south from the main crosscut. There is still ore in the faces. The total length of ore exposed is 230 feet averaging 9.8 dwts. over 50.7 inches. From the 20th to the 22nd level there is a drop in value, although the average of the 22nd level is over an ounce of gold per ton. It is impossible to say yet what the average of the 23rd level will be. The portion of the reef exposed in this level up to the end of the year is wider than in most of the levels above, but it is lower grade. Since the end of the year the reef in the south drive has diminished in width, but improved gradually in value up to 23.3 dwts. over a width of 24 inches. The reef was cut at the 24th level in January, 1921. The reef exposed in the crosscut was high grade. It fell away in the drive south to 5.9 dwts. over 48 inches at 15 feet from the crosscut, while in the drive north it also fell away for a short distance, but then improved again to 34 dwts. over 26 inches at 20 feet from the crosscut. At this level the reef and walls exhibit the same severe crushing as in the levels immediately above, showing that the workings are still in the zone of intense crushing in which the large body of rich ore has been developed below the 13th level. It is difficult to foretell how far this zone may extend in depth, or what changes in value may be met with, but preparations are being made to sink to a much greater depth than has been reached at present. A special survey of the reef shows a gradual reduction of the dip from the 15th level downwards. As a result of this change of dip teh crosscuts from the shaft to the reef have increased in length at each new level until at the 24th level the crosscut is 229 feet long. The cost of these long crosscuts and the loss of time in crosscutting have become serious considerations. To meet this changed condition preparations are being made to start from the 24th level, a new incline close to the reef. A substantial reduction in working cost will be effected by the new gas plant which will be ready during the last quarter of the current year. The buildings and foundations will be ready by the time the plant arrives. The new ventilating incline is well advanced.

Base Metal Resources of the Union.

An article by Mr. T. G. Trevor, A.R.S.M., Inspector of Mines, appears in *The Union Journal of Industries*, on the possibilities of development in connection with the base and non-metallic mineral assets of the Union, which, while capital and energy have been directed to diamonds and gold, have hitherto been to a large extent ignored. In this article the writer approaches the subject from the standpoint of the mineralogist or prospector, and, dividing the country roughly into five mineral areas, not purporting to be absolute geological divisions, he proceeds to give a very interesting and instructive summary of the potentialities for base and non-metallic mineral development, showing that what has been done in these directions up to the present bears only an infinitesimal relationship to the possibilities that yet remain to be explored. Dealing, for example, with the Transvaal "bushveld," the general affirmation is made that this area is probably one of the most intimately mineralised "provinces" of the earth's surface. Touching oil indications, the fact is recognised that the probabilities are against flowing oil in any quantity being found in the Union. Oil shales, however, giving an extraction of over thirty gallons to the ton, are stated to occur at intervals throughout the whole of the lower Karoo. Regarding the prospects in the Wakkerstroom district, to which attention is now being given, it is remarked that if the development of the beds there is successful, which there is every reason to expect, work will be undertaken on the scale of 1,000 tons per day, which will necessitate the employment, for one locality only, of some 200 white men and ten thousand natives. If, Mr. Trevor observes in passing, the oil-shale industry develops in anything like as favourable a manner as the indications give reasons to hope, it alone may go far to compensate for the waning gold output from the Rand. The article brings into strong relief the legal conditions in regard to base mineral resources which at the present time operate to hamper and obstruct prospecting and development, in which respect a contrast is drawn between the Union and Rhodesia, and the view is expressed that until some agreement is arrived at between the Government and the landowners, whereby the latter may be induced to relinquish their present right of prohibition, it is doubtful whether the Union will ever catch up Rhodesia in this respect. "It is not suggested," adds Mr. Trevor, "that the owners should be deprived of their legal rights to the minerals, but it should not be beyond the powers of statecraft to devise some means by which the owners may be persuaded to encourage prospecting instead of acting as they do now—practically prohibiting it—for it is undoubtedly to their interests that the minerals should be discovered and developed, as it is to the interest of every inhabitant of the Union."

ANSWERS TO CORRESPONDENTS

"J. P."—(1) An official statement has been issued to shareholders. You should write to the secretary for it. (2) We know nothing about the industrial share you mention. (3) They seem a fairly promising investment.

"H. V. P."—(1) Yes. (2) £696,000 is the amount of the debenture issue.

"C. L."—The company in question does not publish its list of investments, so it is impossible to answer your question.

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THE LONELY IN APRIL.

The following are particulars of gold, etc., from the Lonely mine for the month of April, 1921: Mill ran 684 hours; crushed 5,320 tons; fine gold recovered, 2,149.356 ozs., value £9,037 8s. 10d.; slimes treated, 5,320 tons; fine gold recovered, 3,149,250 ozs., value £13,243 8s. 3d.; total fine gold, 5,298.606 ozs.; total value at 84s., £22,280 17s. 1d.; profit, £9,267 7s. 2d. The above includes the sum of £93 15s. 6d., adjustment on realisation of February bullion.

Messrs. Pauling & Co. have received instructions states the "Nyasaland Times") to proceed with the borings for the great bridge over the Zambesi. The structure, which is to be laid down at Mutarara, up the river from Chindio, will be a mile and a half long.

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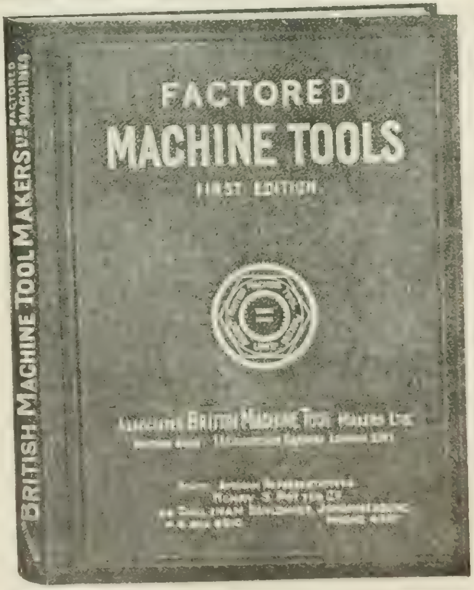

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EDITORIAL.

THE FUTURE OF THE E.R.P.M.

There is nothing strikingly new in the reports of the Government Committee on the E.R.P.M. published at the end of last week, and reviewed by Sir Harry Ross Skinner at the annual meeting of the company on Friday. The serious plight of that property has on several occasions been explained in these columns, and the detailed report of the late consulting engineer, Mr. E. H. Clifford, stated the case with official precision and quite unmistakable directness. The experts, appointed by the Government, are all now agreed in diagnosing the case; but they differ regarding the cure. We need not here traverse the arguments adduced in the Majority and Minority Reports and in the detailed memoranda prepared by Mr. F. H. P. Creswell. A summary of these reports appears elsewhere in this issue, and we hope to print extracts from Mr. Creswell's statements in an early issue. The trouble with the E.R.P.M., of course, is due to two different sets of circumstances, viz., general and particular. Peculiar to the property are the poor development results and the scattered points of profitable working, and in addition are all the burdens common to the other mines of the Rand, such as extravagantly high wages and price of stores, and difficulty of disposing of the product to the best advantage. These general factors have repeatedly been dealt with under their separate heads in our columns; and they are now being carefully gone into by the leaders of the industry and the Chamber of Mines. They may, therefore, be regarded as *sub-judice;* and apart from the brief references made to the facts of the case for reduced wages and obtaining the commodity price of gold made in other columns, nothing more remains to be said this week. The special circumstances surrounding the case of the E.R.P.M., however, invest with peculiar force the plea for Skinner, as all the reportsonly too plainly indicate that the Government assistance for pumping made by Sir Harry Ross unique position of the E.R.P.M. in regard to water on the Near East Rand makes its pumping arrangements of vital interest to the neighbouring mines. Where not merely one mine or group is affected, as in this case, but a whole district of the Rand, the matter is of sufficient urgency and importance to warrant the Government creating a precedent. The facts are so explicitly stated in the reports published, and the consequences of a policy of drift so emphatically shown that we can add nothing to evoke the attention of Government and Parliament. The members of the House of Assembly from the Rand will doubtless be called upon by their constituents to bring up the matter immediately in Parliament; and we know of no question more deserving, as one of urgency, of the fullest and most prompt attention from our elected representatives.

MR. SAMUEL EVANS ON THE CURRENCY QUESTION.

The Chairman of the Crown Mines is one of our leading authorities on the currency question, which he has probably studied more deeply than any other member of this community. Very appropriately, therefore, a good portion of his speech at the Crown Mines annual meeting was directed to a searching analysis of the currency question as it affects producers in South Africa. Mr. Evans was able to prove that there is an unsuspected but very real identity of interest between the farming and the mining industries. He showed how both the mines and the farmers were suffering to-day from the currency chaos; and he declared that the present conditions would continue until the gold standard was re-established and that things could only be put right by the unconditional and complete abandonment of the attempt to force farmers and other producers to exchange their products through the medium of inconvertible paper money, the value of which did not depend on the capital and labour devoted to its production. Mr. Evans went on to show that the history of the past taught us that there could be no general resumption of business until the prices of other things were down to something approaching the level of agricultural and other primary products. The pendulum had swung very far in a direction adverse to gold mining, possibly further than it had ever gone before. It was now swinging back, and judging by precedent it should in time go equally far in the other direction, so that we might see a rise in the value of gold greater than anything that had been experienced since gold had been the money of civilised nations. He warned shareholders, however, that it would be unwise to conclude that they were at the end of their troubles because wholesale prices were rapidly falling. They were not out of the woods yet by any means. Gold mining companies would have a period of considerable anxiety ahead of them, particularly if there was a sudden recovery of the value in gold of British currency unaccompanied by an equivalent reduction in working costs. The saving of the low-grade mines would require a very persistent and determined effort to obtain for the industry the advantage with the least possible delay of whatever reduction took place in the price of commodities and in the cost of living. He was convinced, however, that the turning point had been reached and that henceforth gold would rise in value and that if justice was secured for the industry working costs would decrease as prices fell. There would no doubt be fluctuations, as in the past, but for a great many years to come the general tendency would be in the direction of an appreciation of gold in terms of commodities and services. No summary, however, can do justice to the closely-reasoned address of the Chairman of the Crown Mines on this subject, which, we all know, he has made peculiarly his own and in regard to which he has all along held to an undeviating and uncompromising course. It is to be hoped that his earnest and sincere views will temper the policy of those now responsible for the control of our currency, i.e., the South African Reserve Bank, on the board of which sit some of his own colleagues and co-directors.

THE RAND MINER'S WAGE!

With the premium on gold falling daily and the cost of living also on the wane, it was inevitable that the question of a reduction in the miner's wage should come up for consideration. The Government has, of course, given a useful and courageous lead in the matter by its decision to do away with the War bonus, and the issue of the momentous report on the E.R.P.M. by the Government Committee of Inquiry has further accentuated the necessity for reform and revision in this direction. It is true that the directors of several of the poorer mines have anticipated the official action of the industry as a whole by taking their employees into their confidence and inviting their co-operation in keeping their properties running. But the time is overripe for action on the part of the industry as a whole, in consonance with the agreement made with the men in March of last year that wages should be reconsidered as and when conditions affecting the industry became more normal. By normal, we presume, is meant that as the premium of gold runs off the cost of living comes down; and though it was never expected that the operation of these processes would synchronise, they are certainly active factors in the situation to-day. Some figures compiled by the Consolidated Goldfields throw a strong light on the extent of the increase that has taken place in mine wages since the beginning of the War. Broadly, those statistics show that the amount actually paid out in white wages during 1914, as compared with 1920, by the mines under the control of this group (excepting the Jupiter Gold Mining Company, which was not working in 1914) is as follows: Average total white men employed per month in 1914, 2,220; average total white men employed per month in 1920, 2,729; amount of white wages paid per month in 1914, £57,607; amount of white wages paid per month in 1920, £108,738; increase per annum, £613,500. The tonnage crushed by this group, on the basis which has been taken in arriving at the above figures, represents 12 per cent. of the total tonnage crushed by the Witwatersrand gold mining industry, so it can be estimated that the total increase in European pay for the whole industry, as compared with 1914, has been in the neighbourhood of £4,750,000. This £4,750,000 includes the additional amount on account of extended leave pay to employees, increase in rate of overtime pay, higher minimum rates of pay which have been granted since 1914, as well as in respect of additional men employed. At the E.R.P.M. the chairman, Sir Harry Ross Skinner, showed that the average wage per white employee per month in 1914 was £28.6, and in 1920 £42.2, a difference of £13.6. Taken at the 1914 average rate, the whites employed in 1920 would have earned £226,869 less. At the Durban Roodepoort Deep meeting the chairman, Mr. F. Raleigh, showed that white wages in 1915 were 6s. and in 1920 11s. 4d., an increase of 5s. 4d. per ton, or 88.9 per cent. At the Rose Deep, the chairman showed that white wages had advanced from 4s. 8d. in 1915 to 6s. 11d. in 1920, an increase of 48 per cent. At the Village Deep white wages increased by no less than £39,473 in 1920 over the preceding year. At the Geldenhuis Deep wages increased by £42,032, or 1s. 7d. per ton milled on the year. At the Crown Mines meeting, Mr. Samuel Evans showed that European wages cost the Crown Mines in 1920 £955,801 as against £513,874 in 1913, or an increase of 86 per cent., although a larger tonnage was mined in 1913 than in 1920. Again, of the total expenditure at the Crown Mines in 1913, 29 per cent. was on account of Europeans, 31 per cent. for natives, and 40 per cent. for stores and other costs, while last year 36 per cent. was allocated to Europeans, 25 per cent. to natives, and 39 per cent. to stores and other costs. Had the expenditure on native labour and stores increased in the same ratio as the expenditure on Europeans, the working costs in March last would have been 30s. 7.7d. per ton milled! It is not suggested that wages will come down to the 1914 level. Certain increases in minimum rates of pay were given in the early part of the War period (irrespective of special considerations—such as increase in cost of living, etc.), as being fair and reasonable for certain classes of work. Moreover, since 1914, new leave regulations have been adopted which have added to the cost of European labour. In the case of the Goldfields group the added cost in this particular connection amounts to about £43,600 per annum. The main cause, however, of the large increase is due to the revised rates agreed to by the Chamber of Mines in March, 1920, under which an additional £2 8s. per week was paid to all employees in place of any bonus previously given on account of special conditions caused through the War. At the same time a 20 per cent. increase is estimated to have added a further £2,000,000 per annum to the white wage bill over and above the previous bonus given, which was estimated at £800,000. Commenting on these figures Mr. D. Christopherson wrote: "The causes precedent to the restoration of the parity between gold and sterling may reasonably be assumed to bring about in due course a very material reduction in the cost of living in this country, and this in turn will call for a reduction in the increases referred to above. It is, however, also reasonable to assume from the lessons of past history that a fall in the cost of living is not likely to take place at the rate of the return of sterling towards parity with gold. Consequently there may be a critical interval for the gold mines, more especially for the low-grade mines, which will only be bridged by close and friendly co-operation of employees and employers. Apart from any reduction in the recent increase in wages, a further saving in the white labour bill can be effected by certain relaxations in the Mining Regulations and the co-operation of the Trades Unions in not insisting on the employment of European labour on practically unskilled work, and moderating their views in other directions." We know that the form of relief referred to in the last sentence was definitely refused by the Miners' Union, and the only course open to the mines now is to insist on a direct "cut" in the wage bill. The most effective argument we know in support of the latter course is afforded by the following official statement of working costs of ten mines expressed in terms of the cost per fine ounce produced: Luipaards Vlei, 109s. 9d.; New Goch, 108s. 5d.; Roodepoort U.M.R., 107s. 8d.; Durban Deep, 106s. 6d.; Aurora West, 106s. 2d.; Randfontein, 104s. 8d.; New Primrose, 100s. 1d.; Simmer and Jack, 100s. 1d.; E.R.P.M., 99s. 10d.; Geldenhuis Deep, 98s. 11d. With gold in the neighbourhood of 103s. and on the down grade, there is no need for us to point the moral of these figures. Even the most thoughtless labour man now recognises that neither the Government nor the shareholder will continue to keep an unprofitable mine going, and that the only way to prevent these mines closing down is by an immediate, voluntary lessening in the part of the burden on the mines represented by the present high level of wages.

SOME SPEECHES OF THE WEEK.

The week has produced a notable crop of important speeches from the chairmen of Rand mining companies. That of Sir Harry Ross Skinner at the E.R.P.M. and of Mr. Samuel Evans at the Crown Mines meeting are reported fully elsewhere, and unfortunately the exigencies of going to press on Thursday preclude our printing the other important speeches made on Thursday at the meetings of the "J.C.I." and General Mining subsidiary companies. These will appear in full in our next issue. With the speeches made by Sir Harry Ross Skinner at the E.R.P.M. meeting and of Mr. Samuel Evans at the Crown Mines meeting we deal elsewhere. Here we may note some other important utterances of general application to the whole industry at this critical juncture. Mr. E. G. Izod's speech at the Village Deep meeting is fully reported in this issue, but there is one passage deserving of a wider audience than the shareholders immediately concerned. "The industrial world," said Mr Izod with characteristic directness, "is suffering from a policy created very largely since the great War, namely, the policy adopted by many workers in all walks of life of ' less work and more pay.' The relief which I am absolutely convinced can be obtained by every industry, including our own gold mining industry, is a complete reversal of this policy, and if all those who earn their living on the mines would realise that more work and less pay is far preferable to no work and no pay, then I, for one, am satisfied that many of our mines would not have such a dark future to face. The times ahead of us may call for the exercise of grim determination and self-sacrifice, but I firmly believe that we can and shall make such supreme efforts that the great gold mining industry, which means so much to us on the Rand, will continue to be a flourishing and prosperous one." At the Geldenhuis Deep Mr. Max Honnet, as befitted the case of that mine, spoke in less confident terms. "We are confronted," he said, "with the position that the mine, which has a payable reserve of practically one and a half million tons of ore, valued at 6.1 dwts., a grade which even to-day should allow a reasonable margin of profit, is making losses owing to excessive working costs. This quantity of ore is sufficient to provide employment for our white and coloured workers for at least two years, provided costs can be reduced. In addition to the above reserve, as I have said, we have standing developed in the mine practically 1¼ million tons of ore, which under normal conditions it should be possible to work without loss And yet this company, the pioneer of the Witwatersrand deep level mines, which has spent for many years past something like £700,000 annually in this country, and which employs to-day over 500 white people and over 4,000 natives, stands in imminent danger of being compelled to close down owing to the prevailing high level of working costs." The case of the Geldenhuis Deep is, of course, but one of many along the Reef. Its plight, however, thus pictured so briefly but effectively by Mr. Honnet, points the now familiar moral that working costs simply must be reduced.

Notes & News.

The Deluge of Company Meetings!

It is a pity that Rand companies cannot hold their annual meetings with a small interval between. The deluge of long and important speeches that come about this time all at once each year renders adequate comment difficult and puts a severe tax on our printers. Will those responsible for fixing the dates of the annual meetings please note?

* * * *

A Coaling Record.

Mr. James Cumming writes to us as follows. "At Cristobal coal station, Panama Canal, the steamship *Pakeha* was coaled on December 24, 1920, with 1,002 tons, in one hour and ten minutes. So far as I know, this is the world's record."

* * * *

Big Developments Pending.

Several reports have been published recently regarding an impending flow of capital into the Union on a large scale. Mr. Burton, in the course of his Budget statement, hinted at a development of this kind, and the current number of the *Journal of Industries*, mentions something about the matter. "That South Africa," observes this journal, "is on the eve of industrial developments of considerable magnitude many people who are in a position to follow events closely are aware. But there are other developments about which we are not at liberty to say anything at the moment, but which, when generally known, will arouse the liveliest interest and pleasure among those who are anxious to see the country progress by big strides. These developments will involve an influx of capital on a large scale; and because the names of those concerned are world famous, South Africa will benefit—apart from the actual establishment of the industries concerned—by the confidence thus shown in her by some of the soundest business people in the world."

Gold as a Commodity.

An interesting discussion took place at the E.R.P.M. meeting regarding schemes for making the most of the product of the gold mining industry. Mr. D. C. Greig and Mr. Hyman spoke at length on the subject and Sir H. Ross Skinner in replying said: "This is a subject upon which there are many opinions, and I can assure you it is receiving a great deal of attention from us all, viz., the question of how to dispose of our product to the best advantage. When Sir Lionel Phillips was here we had many discussions, and he will carry those on in London. I think the views put forward by Mr. Hyman and Mr. Greig will be most seriously considered, and if we can find any way of getting a higher price for our product than we are at present we will most certainly adopt it as regards the East Rand Proprietary Mine. We have no obligation to dispose of our gold in one direction or other, only that which leads to the best advantage."

* * * *

General Mining Group.

The annual meetings of the subsidiaries of the General Mining and Finance Group will be fully reported in our next issue, and in the meantime it may be noted from the annual reports that the producing mines of the Corporation made a better showing for 1920 than for the previous year, the working profits totalling £458,640, as against £368,833 for 1919. The improvement is due to the higher price of gold prevailing during the year, the tonnage crushed and gold produced showing only slight variations for the two periods. Aurora West made a working profit of £5,666, as against a loss of £29,238 in the previous year, as a result of a policy of selective mining and the rise in the price of gold. The directors state, however, that owing to the subsequent substantial fall in the price of gold the outlook is once more serious, and they have misgivings as to the ability of the mine to cover expenses under present conditions. Meyer and Charlton has improved on its 1919 result, which was a record, the total revenue (including the premium on gold) advancing to £585,503, which is the largest earned in the long history of this famous Rand mine. Two dividends—aggregating 120 per cent.—were declared, and the dividends and bonuses paid by the company now total £2,815,309, or 1,935 per cent. on the capital (now £200,000) issued from time to time. Though the recovery per ton fell from 13.52 dwt. to 12.77 dwt., this was due to the policy of conserving the known rich reserves, and taking advantage of the premium on gold to explore certain blocks in the upper levels which had been abandoned in earlier years as unpayable. A large tonnage has been won in this way, and the report states that "it seems likely that these blocks of ore will be an appreciable factor in prolonging the profitable life of the mine." The ore thus obtained from reclamation increased from 27.3 per cent. in 1919 to 33.5 per cent. for last year. Heavy losses were incurred at New Goch in the early part of 1920, but a scheme of retrenchment was introduced in May last, and assisted by this and the rise in the price of gold the mine earned a profit of £7,321. Roodepoort United as a result of a drastic scheme of retrenchment and curtailment of development made a profit of £11,434, but at the beginning of this year the price of gold dropped sharply, and at the present figure the directors have serious doubts as to the ability of the mine to earn even a working profit without taking into consideration interest on loans. At West Rand Consolidated the gross profit rose from £61,103 in 1919 to £70,186. The new pumping plant, ordered in connection with the central pumping scheme, is now being installed. The provision of this plant will enable shaft sinking in the main reef section to be resumed in the near future. It has been impracticable to formulate any workable scheme to re-finance Cinderella Consolidated and Rand Collieries so as to place them again on the active list, and these large deep level mines remain closed down. Sacke Estates made a small profit, and continued to husband its cash resources, while the directors report that it has been impossible to formulate any satisfactory scheme for dealing with the mining area held by New Steyn Estate.

THE BUSY MAN'S PAGE.

AN ABSTRACT OF CURRENT INFORMATION FOR MINING MEN, ENGINEERS AND INVESTORS.

FORTHCOMING MEETINGS.

A Company Diary.

Rand Mines.—Corner House; June 2

Union Corporation, Ltd.—Ordinary general meeting; 94 Main Street; June 3, 11 a.m.

Transvaal Consolidated Land and Exploration Co.—26th ordinary general; Corner House; June 15.

What to Read in the Technical Press.

A DIGEST OF CURRENT LITERATURE.

Mining and Metallurgy.

President's Address, I. of M. & M.—Mining World, April 30, p. 399.

Iron and Steel.

Iron, Steel and Engineering Companies' Results.—The Statist, April 30, p. 722.

The Thyssen Works (Illustrated).—Iron and Coal Trades Review, April 29, p. 589.

Locating of Ore by Electric Survey.—Iron and Coal Trades Review, April 29, p. 596.

Coal Mining.

Mechanical Power in Mines and Its Future.—Colliery Guardian, April 29, p. 1235.

Ignition of Gaseous Mixtures by Induction Coal Sparks.—Colliery Guardian, April 30, p. 1237.

Coal Pillar Drawing Methods.—Iron and Coal Trades Review, April 29, p. 598.

Miners' Cap Lamps.—Colliery Guardian, April 29, p. 1248.

Wear in Winding Ropes Discussion.—Colliery Guardian, April 29, p. 1252.

A Big Coal Storage Unit.—Iron and Coal Trades Review, April 29, p. 597.

Engineering.

A Safety Device for Air Compressors.—Iron and Coal Trades Review, April 30, p. 601.

Trucks and Industrial Locomotives.—The Engineer, April 29, p. 456.

Trials of Motor Tractors.—The Engineer, April 29, p. 464.

Electricity.

The Storage of Energy.—Colliery Guardian, April 30, p. 1249.

The Long Distance Telephone System of the U.K.—Electrical Review, April 29, p. 566.

Automatic Cable Protective Gear.—Electrical Review, April 29, p. 563.

Industrial.

Asbestos: An Empire Product.—The Statist, April 30, p. 738.

Lever Bros. Annual Review.—The Statist, April 30, p. 746.

Our Industrial System.—Investors' Chronicle, April 30, p. 518.

Economics.

The Frontier of Control.—Colliery Guardian, April 29, p. 1258.

A Free Market for Gold.—Financial News, May 3, p. 2.

Metal Market.

Latest quotations:—Standard copper, £76 5s. 3d. cash, £75 2s. 6d. forward; electrolytic copper, £76 cash, £77 forward; Straits tin, £183 7s. 6d. cash, £183 15s. forward; English lead, £24 10s. cash, £24 10s. forward; silver, 33⅛d. per oz.; fine gold, 102s. 8d. per oz.

The next monthly meeting of members of the Geological Society of South Africa will be held in the Main Hall, Scientific and Technical Club, 100, Fox Street (between Rissik and Loveday Streets), Johannesburg, on Monday, 30th May, 1921, at 8.15 p.m. Business: The minutes of the ordinary monthly meeting of members held on 21st February, 1921, will be read. Election of new members. The following papers will be open for discussion: "Note on the Nature and Origin of the Crocodile River Iron Deposits," by P. A. Wagner, D.Eng., B.Sc.; "The Age of the South African Kimberlites and their Occurrence in Cretaceous Beds," by H. S. Harger. The following papers will be read: "Note on Some Fossils from the Vaal River Gravels," by S. H. Haughton, B.A., F.G.S.; "The Geology of the Neighbourhood of Heidelberg," by A. W. Rogers, D.Sc. (Cantab.). The latter paper is bound to provoke great interest and discussion.

Dundee Coal Company.

The report of the Dundee Coal Co., Ltd., for 1920 states that 76,750 bonus shares were distributed among shareholders on 10th September, 1920. Amount spent at Burnside was £22,643 and at St. George's £95. A considerable additional quantity of plant has been received during the year, and expenditure on plant and construction up to 31st December last was £186,020. Output of coal was 317,275 tons, increase of 14,599 tons. Sales of coke were 3,020 tons, compared with 4,520 tons the previous year. Amount written off for depreciation was £21,548, paid as dividend tax £1,894, estimated for normal tax £2,481. Balance carried forward, £22,615, less dividend No. 11.

* * * *

The Continental Market for Our Ores and Raw Materials.

An interesting sign of the times is the number of inquiries we are now receiving from Scandinavian and German firms regarding mineral ores and raw materials produced in South Africa. There can be no doubt that the Continent of Europe is largely in need of base metal and other products of this country as the raw materials of their semi-starved industries, and that the revival of their trade and industry will mean the opening up of a large and profitable market for South African producers. Germany and the neighbouring countries that were neutral in the war are now making big efforts to rehabilitate their industries, and in this way the advent of a real peace, so warmly advocated by Mr. Lloyd George and General Smuts, must benefit this country substantially and directly.

The "Mining Journal's" Essay Competition.

The enduring improvement which our mines require can only be obtained through the media of better efficiency and lower working costs and with a view to eliciting constructive views on these supremely vital subjects the *South African Mining and Engineering Journal* offers a prize of £25 for the best essay on the subject of "How to Improve Efficiency and Lower Working Costs in and on the Mines of the Witwatersrand."

Criticism should be constructive rather than destructive, but the assurance is given that no competitor will in any way be prejudiced in his employment by the submission of criticism of existing means or methods.

Essays containing libellous or malicious statements against any particular individual or individuals will not be considered.

TERMS OF THE COMPETITION.

The conditions of this competition are as under:

1. Essays must not exceed 2,500 words in length, and where new or suggested devices form an essential portion of the Essay, the contribution should be accompanied by diagrams clearly exhibiting the nature and functions of such device or devices.
2. Essays should be typewritten or written in easily legible handwriting on one side of the paper (preferably of foolscap size) only.
3. Each essay must state the full name and address of the author and if the author is an employee of a Mining Company operating in South Africa or has been an employee of such a company, his occupation and position should be stated.
4. Essays and diagrams (if any) must be addressed to the Editor, the *S.A. Mining and Engineering Journal*, Box 963, Johannesburg, and be marked "Competition" in the top left-hand corner of the containing envelope.
5. The competition closes on July 1st, 1921.
6. In the event of the Committee of Adjudication deciding that no essay submitted merits the award of £25, the Committee will have power to withhold the award of such a prize and to give in lieu thereof an amount which they consider proportionate to the value of the best article or articles submitted.
7. It shall be at the option of the Editor of the *S.A. Mining and Engineering Journal* to publish any essay or any portion of any essay submitted and to pay for such essay or portion thereof at the rate of £2 2s. per page according to the measure of pages in the *S.A. Mining and Engineering Journal*.
8. No correspondence can be entered into regarding this competition, and the Editor of the *S.A. Mining and Engineering Journal* will not hold himself responsible for the safe return of any manuscript submitted, but where a stamped and addressed envelope is forwarded with each contribution the Editor will, after adjudication, endeavour to return unsuccessful contributions.
9. A competitor may submit more than one contribution.
10. It is an express condition accepted by and binding upon all competitors that the decision of the Committee of Adjudication as constituted above or of any alternative adjudicators is final and absolute. Submission of manuscript will infer a full understanding of the acquiescence of the competitor in this and other conditions of the competition.
11. Essays may be written in either of the official languages.

Points for Competitors.

There are one or two matters in connection with this essay competition which we would like to bring to the notice of competitors.

In the first place it should be made clear that a good idea will not be debarred from winning the prize offered because the contribution fails from a literary point of view. Neither will brevity be a handicap. On the contrary we shall welcome briefly expressed ideas and suggestions provided that they contain some useful and new idea or some better application of an idea or device which is not new or novel.

A committee of well-known engineers connected with the mining industry has been appointed to adjudicate in conjunction with the Editor of this paper.

A Booklet on Health.

Your Health and How to Keep It is the title of a booklet published under the auspices of the Prevention of Accidents Committee of The Rand Mutual Assurance Co., Ltd., for the benefit of employees on the mines. It contains articles on health by Dr. A. J. Orenstein, Superintendent of Sanitation, Rand Mines, Ltd., and by other recognised authorities. Its purpose is to help the mining community to take care of its most valuable asset—health. That it will achieve much in this direction there is no doubt, for the articles are written in a simple, homely and interesting way. It is gratifying to learn that the demand for copies has been so great that it has been found necessary to publish a second edition. This is now ready and copies are on sale at Railway Bookstalls and Central News Agency stores. Mine employees may obtain copies at their mine offices.

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ENGINEERING SECTION.

The Heat Treatment of Mining Drills.

By E. A. Wraight, A.R.S.M.

We are glad to be able to print the following practical contribution on the application of scientific methods to the heat treatment of drills, a subject offering a big field for economy on the mines.

The heat treatment of drill steels is a subject which is engaging some little attention among mining engineers at the present time, consequent upon the advanced cost of labour, the price of steel and the necessity for maximum output in order to reap the advantage of the gold premium. Many of the breakages which occur with drills can be traced directly to faulty heat treatment. In the past, this work has been largely in the hands of unskilled operators and even natives, hence radical reform in this direction is long overdue. The successful heat treatment of all varieties of steel is an operation following strictly scientific principles and any effort expended in avoiding the "personal equation" so largely prevalent in the smithy will be amply repaid in the lessened consumption of steel, increased depth of drilling per drill bit, fewer breakages and "stock" drills, or in other words, increased efficiency.

Chemical Analyses.

No standard specification apparently exists for drill steels and the chemical analysis of different brands accordingly varies within fairly wide limits, which are approximately as follows:—Carbon, ·50—1·0 per cent.; silicon, ·05—·30 per cent.; sulphur, ·01—·06 per cent.; phosphorus, ·015—·05 per cent.; manganese, ·20—·50 per cent. The above figures were obtained as the result of a large number of analyses, but it must be stated that the bulk of the steels tested were well within the extreme limits. While it is generally recognised that the sulphur and phosphorus contents should be as low as possible and the manganese should not greatly exceed ·35 per cent., the percentage of carbon introduced into drill steels appears to vary with every different maker. In one case this element showed a variation of no less than 17 points (·17 per cent.) in the same consignment.

Conditions Aimed At.

The aim of the steel maker is to produce a drill that shall be capable of being properly hardened, and at the same time possess no inherent brittleness on account of the nature of the work it has to perform. Such conditions are apparently best met by a steel of about ·75 per cent. carbon for a 1in. bar, the percentage being slightly raised or lowered according to the decreased or increased diameter of the drill. Any variation in the carbon content of the steel has naturally an important bearing on the heat treatment to which the "bit" should be subjected, and it is essential that when several drills are treated together, the steel should have the same composition. It is a matter of general knowledge that the temperature most suitable for the hardening and quenching of most steels is just above the upper critical point. The significance of this point has already been explained in former bulletins, and in order to avoid further explanation and to put the matter into a nutshell, it may be briefly stated that at this point all the important changes which occur in the constitution of steel during heating are completed. Further, the temperature at which this critical point occurs varies with the composition of the steel.

Critical Points.

As the result of careful investigation by various metallurgists the critical points of a large number of carbon steels have been accurately determined. Hence, if the composition of a plain carbon steel is known, the temperature at which the critical point occurs can be readily ascertained.

The use of a pyrometer, however, may possibly be regarded as an unnecessary refinement in a mining smith's shop, and a more practical and probably more reliable method in unskilled hands of determining the proper *quenching* temperature is by means of a magnetic test, as the point at which drill steel becomes non-magnetic corresponds with its proper critical point, provided the carbon content is not lower than ·35 per cent.

By the application of the above principles the exact, and therefore the best, point for the hardening quench of any drill steel can be readily determined. It should always be borne in mind, however, that the drill should be raised a few degrees (not exceeding 30° C.) above this temperature in order to compensate for the rapid loss of heat due to radiation during transference to the quenching bath unless the transference is very rapidly effected. Further, by the employment of electrically heated furnaces, any personal error can be entirely avoided, and the whole process made automatic by means of a suitable indicator attached to the furnace.

One very important factor seems to be overlooked by the smith, and that is the necessity for a relatively slow careful heat if the bit is to be uniformly treated and the best results obtained. Further, the quenching temperature must not in any case exceed 800° C.

Penalties of Neglect.

Neglect of these precautions leads on one hand to irregular hardening and cracking, and on the other to a coarse grain, increased brittleness and, in extreme cases, to "burning" of the steel, whereby it is rendered useless. A method practised at many mines is direct quenching from the forging or sharpening operation. This has the advantage of saving time and it is commonly believed that "the benefit of forging" is thereby retained. This statement must be distinctly open to question, and the quenching temperature is thus rendered a matter entirely of guesswork. Apart from this consideration, a greater length of the drill must be heated if this practice is followed, otherwise owing to rapid loss of heat the steel will be quenched at far too low a temperature. This is a more common error than is generally supposed to be the case, with the result that the bit is "soft," or at best only partially hardened, leading to blunted bits, loss of gauge, stuck drills and fracture. In order to obtain the best results it cannot be too strongly emphasised that hardening should form a distinct and separate operation.

Correct Forging Temperature.

The question of the correct forging temperature is one of great importance, and the practice of judging temperature by the eye with no precautions whatever to obtain even a relative degree of accuracy is far too common. This practice may be perfectly satisfactory for a trained man (and the accuracy obtained is sometimes astonishing), but on the other hand the personal equation is a factor not always infallible. The higher the forging " heat " the easier is the steel to work and the better pleased is the smith, but it must not be forgotten that a coarse crystalline structure is being set up, not altogether easy to remove and which may account for subsequent failure. Further, the drill is being gradually decarbonised at a point which will eventually become the bit, and after several heatings may be found too soft for satisfactory service. The best temperature for forging lies within the range 950° C.-1050° C. for a steel of ·75 per cent. carbon content. The drill should be slowly (but not too slowly) and uniformly raised to the forging temperature in a properly designed furnace and rapidly worked. Should the temperature fall below the upper critical point the steel must be reheated for finishing, otherwise internal cracking is liable to develop with subsequent breakage underground.

It has been established beyond question that work effected on steel by hammering or rolling at a temperature somewhat above its upper critical point, breaks down the crystalline structure, and the nearer the finishing temperature of the operation to this point, the smaller the crystals and consequently the greater ductility, higher elastic limit and ultimate stress of the steel.

This phenomenon is spoken of by drillmen as " closing up the grain " or " putting life " into the drill, and may account for the fact often noticed by miners that the drill is " improved " after being sharpened two or three times.

Ideal conditions for the proper treatment of drill steel are, of course, utterly impossible in isolated mines and out-of-the-way districts, but any attention to details of the above nature will be well repaid, especially with the present price of drill steel, the heavy freight of same and the difficulty frequently experienced in obtaining suitable supplies. There is no reason whatever why scientific methods should not be immediately applied to the heat treatment of drills in all modern and well-equipped mines.

ENGINEERS AND THE ELECTRICITY BILL.

Speaking at the last monthly meeting of the South Africa Institution of Engineers, Mr. R. C. Atkinson referred to the Electricity Bill, and said that the outstanding points in the Draft Bill which in opinion of the Joint Committee of the Institution of Engineers and Electrical Engineers, required amendment were, amongst others, the constitution of the Board of Administration. The proposal in connection with this matter was that there should not be less than three, nor more than five members, one of whom was to devote all his time and skill in engineering to his particular office, and another to be possessed of administrative and legal experience, both to become officers of public or railway services. The third, presumably, was to be chosen from men available in ordinary industry. The Council suggested that the Board should consist of three members, two nominated by the Governor-General to be engineers of high standing and with business experience, and the third member might be nominated by the Government. They were in agreement with the principle of the Bill, and recognised the urgent necessity for such, but they submitted that the constitution of the Board of Control should be independent of any Government department, otherwise it would be difficult to act impartially in respect of municipalities. The exclusion of Government and railway departments from control of the Bill was in their opinion against the best interests of the country, for they maintained that all should be treated alike. With regard to the period of licence, they suggested that it should be extended from 25 to 35 years.

Transport Improvements in the Congo.

A matter of prime importance to the Belgian Congo, the French Congo, and Central Africa generally is the decision to carry out great improvements and extensions of the Matadi-Leopoldville railway. Plans have been laid for far-reaching alterations, and work has already commenced on what is to be a four-year contract.

Belgium has also given an undertaking to connect with the Portuguese railway in Angola, and in course of time various other constructions will be undertaken. For the present, however, she is recognising the wise principle of discrimination. For instance, instead of overstraining herself in the desire to bring the rich Katanga mineral district into direct touch with the Lower Congo, she is content to allow that province to be served by British lines via the Union of South Africa.

The navigability of the Lower Congo is to be improved, the river fleets to be enlarged, the roadsteads and port of Matadi to be made able to handle the traffic that comes their way. Nor is road construction to be overlooked. It is transport facilities that are required, and on that task the Minister is first bending his energies.

Mr. A. Spicer has resigned from the secretaryship of the Scientific and Technical Societies Club as from the end of this month, and his place will be taken by Capt. H. A. G. Jeffries, Secretary of the Chemical, Metallurgical and Mining Society of South Africa.

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Railway Development in Africa.

THE TRANS-ZAMBESIA, CONGO AND BENGUELA LINES.

By Prof. E. H. L. Schwartz.

In the following interesting review, Prof. Schwartz sums up the present state of railway development throughout the African continent, with particular reference to the Congo, Zambesia, and Benguela.

While development in South Africa has to a large extent been held up by the financial difficulties of the present time, a large and important programme of railway building has been initiated and is being carried out in the north. Some of these projects affect us in South Africa, very vitally, and while we need not feel aggrieved at the progress of our late allies in their respective countries, the facts should be better known, so that we can adjust our outlook to the changing conditions.

Trans-Zambesia.

In the east, the Trans-Zambesia Railway marks a very important advance, which will react upon the British territories adjoining and bring about changes which it would be well to study. The Shire Highlands Railway was originally built to carry the produce of Nyasaland from Blantyre to Chiromo, on the Shire River, but owing to the failing of the river, the line was brought down to Port Herald and eventually to Chindio, on the Zambesi. Now, however, the Zambesi has failed and the line is to be brought across the Zambesi, through Portuguese territory, to Beira. While freight could be carried up the Zambesi, from the Chinde mouth, which was discovered by Dr. Livingstone, the whole route was open, since the Zambesi had been declared an International waterway; in the future all Nyasaland produce will have to pass through Portuguese territory and be handled at a Portuguese port. The contractors for the railway are Messrs. Pauling and Co. and the finance of the railway is secured by the Nyasaland Protectorate undertaking to make good to the company for a period of 25 years any deficiency in the earnings of the railway required to make up the sum for the 6 per cent. interest on the debentures. British energy and British money are, therefore, being employed in developing a very valuable tract for our gallant allies, not that we need begrudge the Portuguese for their good fortune, but it does seem hard that our own enterprises are being starved at the same time. When the Shire Highlands Railway is carried to Lake Nyasa and this lake connected with Tanganyika by rail, and train ferries placed on the lakes as projected, this line will become one of the main outlets for Central Africa and Beira one of the greatest ports in Africa.

The Congo.

Still more important developments are taking place in the Congo. There is something more than mere desire to develop their resources in the feverish pushing forward of the railways by the Belgians in the Congo, and I cannot do better than quote the words of M. J. Rousseaux in the current number of the *African World Annual.* They are words at which we cannot take offence, but which we should carefully consider. "M. Franck, the Belgian Minister for the Colonies, has decided in favour of the construction of the Kasai-Katanga section of the Lower Congo-Katanga Railway, which, when completed, is to connect Kinshasa, on the Congo Railway, with Bukama. The enormous mining and agricultural richness of the country to be crossed is certainly one of the reasons of the decision of the Minister, but the chief reason was the utmost necessity of freeing Katanga from her southern neighbours. Leaving aside the unfavourable exchange rate, which is rendering living so expensive in Katanga, the strike on the Rhodesia Railway early last year and the boycott of the Katanga traffic by the workmen on the Rhodesia Railway, during the strike on the Katanga Railway, have been decisive arguments in favour of the immediate construction of this national route. The national interest commands us to connect the Katanga with Matadi, in order that, first, we do not pay to foreign transporters, millions and millions of francs which could be paid to national transporters, and, second, in order that the South African ideas, brought in the Katanga by the Rhodesian Railway, be counterbalanced by the Belgian mentality. Thus, South Africans wish to bring the Colour Bar into the Katanga and we do not want it. To avoid any misinterpretation of this, M. Franck has asked me to remember the statement he delivered at the banquet given in his honour, on his return from the Congo, by the Brussels Cercle Africain: Of course, we do not desire an impossible assimilation between two such different races, but we also do not want a Colour Bar. We do not criticise the policy of our British friends, but everyone must be master of his own house."

This Lower Congo railway has been made possible by two far-reaching discoveries. At Sankishia, some 20 miles south of Bukama, a very extensive coal deposit has been found and is being worked by the Luena Syndicate, Sankishia being on the Luena River. The coal is suitable for locomotives and for burning cement, etc., but so far has not proved suitable for making coke. Thus, the Belgian railways have become independent of the Wankie coal. Further, on the Kasai, near Djoko-Punda and on the Kwango River, enormous deposits of alluvial diamonds have been found, the output from the fields being 215,489 carats in 1919. The Forminière, the company working the deposits, employs 45 white men and 10,000 natives. Here, then, right in the line of the proposed railway, is a large industry, apart from the natural products of the forests, which will secure the payability of the line. The present port for the Katanga, Beira, is 14,732 kilometres from Antwerp, by the Atlantic route and 14,847 kilometres by the Suez route, but from Antwerp to Matadi, the port at the mouth of the Congo, there are only 5,352 kilometres. For the Katanga region, the land journey from Matadi is practically the same as from Beira, so that the development of the Lower Congo railway will bring this great industrial centre very much closer to Europe. Altogether, what with a railway to the north-eastern goldfields at Kilo, the section within the Congo, to connect with the Benguela Railway and the projects just now outlined, the Congo administration proposes to spend an amount of 660 million francs on immediate railway development, but the estimate is expected to be very much exceeded when the lines come to be built.

Benguela Railway.

The Benguela Railway, of which Mr. Robert Williams is the active genius, begins at the natural deep-water port of Lobito Bay, in Angola. From the Bay to Tshilongo, on the Congo border, is a distance of 1,800 kilometres, of which 520 have been completed. Railhead is now in the desert, 100 kilometres from Belmonte in Bihe, but the earthworks are completed as far as kilometre 637 and construction is being actively prosecuted. The Belgians, as stated above, are pushing on from their end and the completion of the whole line is practically in view in the very near future. Now these two railways open up ports connecting the interior of Central South Africa with Europe on far more favourable terms than can be obtained from Cape Town. Cape Town is in round numbers 6,000 miles from Southampton; Lobito Bay 4,850, and Matadi 4,600 miles. There can be no doubt that the carrying trade with the interior will follow the shortest route, and the extra 1,150 or 1,400 miles of sea-route to Cape Town will be prohibitive when the Belgian and Portuguese railways are in full working order.

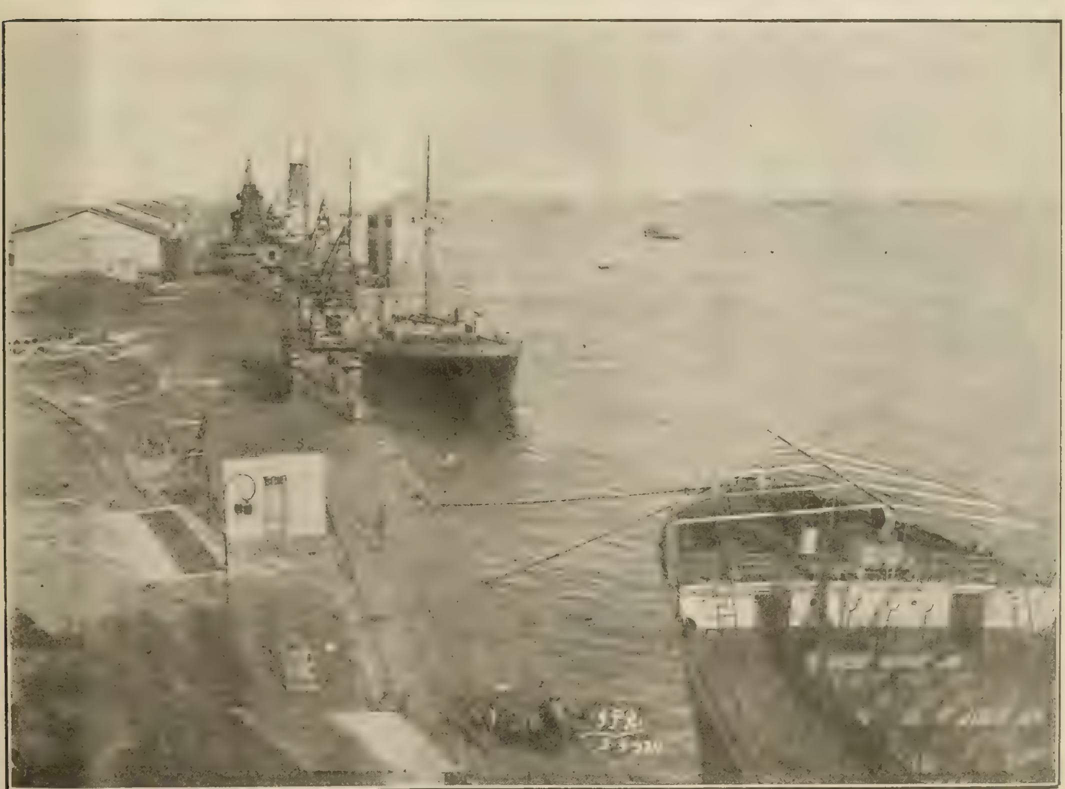
Development.

There is no space now to develop the point further in the present article, to deal, for instance, with the new harbour on the West Coast, Port Harcourt, with its railway built during the war to the Udi coalfields in Nigeria, but enough has been said to drive home the fact that Africa is waking up to an unparalleled period of expansion; regions before the war untrodden by the foot of the white man are now connected with the coast by motor services and railways, are under survey or actual construction. South Africa, to keep in the swim, must do something more than fight to simply carry on as heretofore. The tide is against her. £900,000,000 has been taken out of her in mineral wealth and the country is beginning to feel the drain, since very little comparatively has been put back in the form of permanent improvements. My own remedy, of course, is the Kalahari project, whereby, while there is money in the country, its future as an agricultural country can be assured, when in course of time the mines gave out and South Africa will become a humble customer of the brilliant new fields for enterprise in Angola and the Congo. Our monopoly of diamonds has passed away, for not only on the Kasai, in Portuguese and Belgian territory and on the Kwango, have diamonds been found, but prospecting parties are hunting everywhere and it is only reasonable to expect that other places will be found. As a matter of fact, diamonds have been found near Akkim, on the West Coast, in great quantities, and they are of such a nature that larger ones will turn up in their original matrix. Copper, of which up to a year ago South Africa used to export such quantities, now chiefly comes from the Katanga, and even in French Congo copper mines are being opened up at Mimuli, entailing a new railway from Pointe Noire to Brazzaville on the Congo. On every side there are signs that we may be surpassed in the near future, and only by a policy of looking to the large issues can our country be made secure in her pre-eminence, which her history and sacrifices in the past entitle her to.—*Cape Times*.

Where Australian Gold Goes!

A Press telegram from Melbourne, dated 30th March, says: "In moving the adoption of the report and statement of accounts at the annual meeting of the Gold Producers' Association, Limited the chairman (Mr. E. C. Dyson), said that during the 22 months since the foundation of the association 7,824,854 sovereigns or 2,009,597 standard oz. had been disposed of, realising a net distribution premium of £2,390,097. Practically all the recent sales had been effected with the United States, but the board was retaining its Eastern connections until the position was clearer. America, for practical purposes, was the only perfectly free gold standard country at the present time. The importance of a prospective decline in prices, which he believed to be imminent, was as great in the case of gold mining as in any other industry. He suggested for the consideration of our financial institutions that a free market for exchanges, at a rate more commensurate with the true position, would not only be healthier, but would, through the higher premium on London money, supply an automatic stimulus to the great primary industries and a natural check to unhealthy over-importations.

Coaling Activity at Delagoa Bay.



Ships awaiting their turn to coal at the coal-loading plant, Delagoa Bay.

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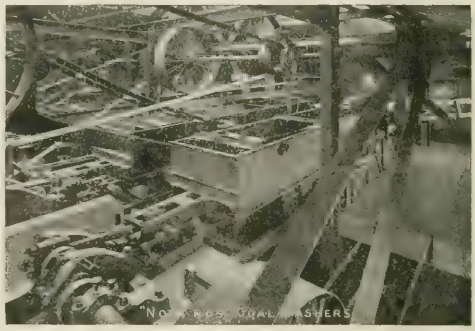

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IMPORTANT.

Our attention has been drawn to Mr. C. G. Elliott's remarks anent THERMIT WELDING, on page 282 of the "S.A. Mining & Engineering Journal," dated November 20, 1920,

"PLATES vs. BAR FRAMES."

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The Week in the Sharemarket.

FIRM DESPITE UNSATISFACTORY NEWS FROM EUROPE—OVERSEA TROUBLES CONTINUE—GOLD PREMIUM FLUCTUATIONS—COAL SHARES IMPROVE.

The news from Europe has certainly not improved during the week, and neither the coal strike nor the Silesian trouble shows any signs of alleviation. Naturally London remains passive in face of such complications, and until things settle down in Europe we can hardly expect any lead from that side. What effect the annual addresses from the chair at Rand company meetings will have remains to be seen. The speeches dealing with properties on the Far East Rand are regarded as encouraging, but the tale of increasing costs due to inefficient labour and high wages at other mines is most depressing. The serious straits to which the major portion of the industry is now reduced must have its effect on the attitude of the white employees; and it is believed that the result of the discussion now in progress between the Chamber of Mines and the men will be to put things on a more healthy basis as regards wages and efficiency. Gold has fluctuated during the week, and touched 102s. 4d. at one time, according to the cables. It has since recovered slightly, and according to some prophets may go better with the approach of the season of American harvest exports. "One cannot argue with a prophet," of course; but it is permissible to hope that we have seen the lowest level of the premium for this year. Gold stocks, on the whole, have kept firm locally during the week, and Gedulds have been a particularly bright feature, touching 50s. on Wednesday. The options improved to 13s. buyers on the same day. Diamonds and tins were very quiet, but colliery shares were naturally in increased demand, and are bound, of course, to go better if the demand for the product continues to increase at its present rate.

	Frid. 20th.	Sat. 21st.	Mon 23rd.	Wed. 25th.	Thrs. 26th.
Anglo American Corp	19 0*	19 3	19 6	19 9	19 6
Apex Mines	8 3†	7 6*	7 6	7 6*	7 6*
Bantjes Consolidated	5 3*	5 3*	5 6	5 6	5 3*
Brakpan Mines	53 0*	53 0*	53 0*	54 0*	52 0*
Breyten Collieries	5 0*	5 0*	5 0*		5 0*
Brick and Potteries		4 0*	4 0*	4 0*	4 0*
Bushveld Tins	0 9*	0 9*	0 9*	0 9*	0 11†
Consolidated Diamonds	28 0*	26 0*	26 0*	27 6	30 0*
City Deeps	41 0*	43 0†	41 0*	42 0*	
Clydesdale Collieries	28 0*	26 0*	26 0*	27 6	30 0*
Consolidated Langlaagtes	12 0†				
Consolidated Main Reefs ...	10 9	10 9	10 9		10 6*
Coronation Freeholds	0 11*	0 11	0 11	0 11*	
Do. Syndicates	4 3*	4 6	5 0†		4 0*
Crown Diamonds	2 10	2 9*	2 9*	2 9	2 9
Crown Mines				41 0†	
Daggafontein Mines	3 6*	3 6*	3 3*		3 5
East Rand Coals 0	2 3*	2 3*	2 3*	2 3*	2 3*
East Rand Deeps		0 6*	0 6	0 6*	0 6*
East Rand Proprietary	4 6	4 3*	4 3*	4 0*	4 0*
East Rand Debentures	£66*	£66½*	£66½*	£66*	£66½
Eastern Golds	0 6*		0 6*	0 6*	0 6*
Ferreira Deeps	10 0†	7 0*			
Frank Smith Diamonds ...	3 2	3 2	3 1	3 1	3 0
Geduld Proprietary	48 6	48 3	48 3	49 6	49 9
Glencoe Collieries	13 6	13 6	13 7	13 7½	13 7
Glynn's Lydenburgs					10 0†
Government Areas	80 0*		80 10	80 0*	80 0*
Hume Pipes	19 3†		19 0†	17 0*	19 0†
Jupiters	3 9*	4 0		3 9*	3 9*
Knight Centrals	3 10*	4 0*		4 2*	4 2
Knights Deeps		15 1			15 0*
Lace Proprietary			8 0†		
Leeuwpoort Tins	11 2*	10 0*		10 3*	10 6
Lydenburg Farms	4 9*	4 9*	4 10	4 9*	4 11
Middelvlei Estates			1 0*		
Modder B's	24 9	25 0	25 0*	25 3	25 0*
Modder Deeps	44 9*	44 9*	44 6*	44 10½	44 0*
Modder Easts	10 7½	10 6	10 6	10 3	10 4½
Do. Options (4 years)	0 3†	0 3†			
Natal Navigation Collieries	35 6*	35 3*	35 6	35 0*	36 3
National Banks				220 0*	
New Era Consolidated	6 9*	7 0	6 9*	6 9*	6 9
New Geduld Deeps	1 4*	1 4*	1 3*	1 3*	1 4*
New Kleinfonteins	5 6*	5 6*	5 7*	5 8*	5 8*
New Modderfontein	65 6	66 0	65 9	65 9*	65 6*
New States	20 0*	22 0*	22 3*	22 3	22 3*
New Unifieds		4 3*			
Nigels			4 0*	4 0*	—
Nourse Mines		6 9*			
Pretoria Cements	52 3*	52 9†	51 9		51 6*
Princess Estates		1 0*	1 0*	1 0*	1 0*
Rouxville Diamonds	1 8	1 9	1 10	1 9*	1 7*
Rand Collieries			1 0*		
Rand Nucleus	1 0*	1 0*	1 0*	1 1†	1 1†
Randfontein Estates	13 9*		13 9*	14 0	13 9
Roberts Victors	5 0*	5 1*	5 1*	5 0*	5 0
Ryan Nigels			3 6*		-
South African Lands	4 4*	4 6*	4 6*	4 7*	4 6*
Springs Mines	33 3*		34 0*	34 3*	34 3*
Sub Nigels	12 6	12 0*		12 0*	12 3*
Swaziland Tins		5 6*	5 6*	5 6*	–
South Van Ryns	2 9*			2 9	2 9*
South Van Ryns	2 9*			2 9	2 9*
South African Townships	10 9	10 6	10 6	10 4½	10 6
South African Alkali	20 9	21 6	22 3	22 0	21 6
Do. Options	3 0*	5 3*	6 0*	7 0*	–
Transvaal Silvers	27 0	28 3	28 6	28 0	28 6
Transvaal and Delagoa ...	50 0*		50 6	50 0*	–
Tweefontein Collieries ...		20 0†	16 0*		—
Transvaal Con. Lands ...	18 0*	18 0*	18 0*	18 0*	18 0*
Transvaal G.M. Estates ...		7 9*		7 0*	6 9*
Van Ryn Deeps	73 0	72 6*	73 0	74 0†	73 3*
Village Deeps	7 3*		7 3*	7 3*	7 3*
Union 5 per cent	£98	£98	£98	£98	£97½*
Van Dyks	1 3*			—	—
West Springs		12 0	11 9*	11 6*	11 6*
West Rand Consolidated		2 0*	2 3*	2 3*	-
Western Rand Estates...	3 3*	3 6†	3 6*	-	3 6*
Witbank Collieries ...	44 0*	44 0*	44 0*	44 0*	44 3*
Witwatersrands	13 0†		13 0†	13 0†	-
Witwatersrand Deeps	5 0*		5 6*	6 0*	6 6*
Wolhuters	3 0†	3 0*	3 0*	3 0*	3 1
Zaaiplaats Tins	3 1*	3 6	3 6*	3 6	3 6*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

The award of the South African Institute of Electrical Engineers (junior section) for the best paper read before the section during the 1920 session, has just been made, and this honour has fallen to Mr. W. Tredre, of the engineering department of the Nourse Mines, Ltd., for a paper on "The Lay-out of Indoor and Outdoor Sub-Stations for Industrial Services." Another paper of merit was that read by Mr. C. M. Hunter, of the staff of the Dock Road power station, Cape Town, on "Storage Battery Practice," and for this Mr. Hunter also received an award.

Some Rand Mines Subsidiaries.

The report of Rand Mines enables us to review the results secured by those mining companies of the group whose financial year ends on the 31st December, and to give the appended tabulation of salient points in the statistics for the past year, contrasted as regards the profit items with the figures relative to 1919:

Company	Total Profit. 1920.	Total Profit. 1919.	Profit per ton. 1920.	Profit per ton. 1919.	Ore Reserves. 1920.	
	£	£			Tons.	Dwt.
City Deep ..	644,184	462,566	15 1	14/10	3,099,200	9·0
Crown Mines ..	1,067,182	719,870	9/11	7 8	8,131,700	6·4
Durban Deep ..	1,571	*16,994	1/	*1/2	1,094,900	6·6
East Rand P. ..	152,363	286,596	2 8	4 4	2,410,850	6·1
Geldenhuis Deep..	78,037	61,672	3	1 11	1,467,100	6·1
Knight Central ..	69,040	18,574	4 8	*1/7	150,700	6·1
Modder B.. ..	917,915	881,036	29/3	26 1	300,600	8·6
Robinson Gold ..	89,194	88,896	3 8	3 3	115,200	
Rose Deep ..	220,471	198,248	6 10	6/7	3,060,040	5·1
Village Deep ..	138,332	108,394	4/7	3 11	2,381,200	6·1

* Loss.

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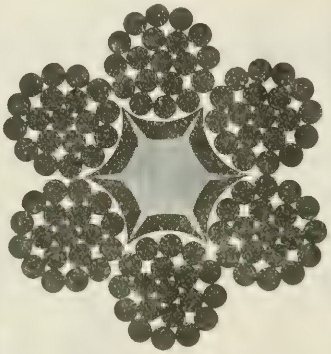

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

MORE HOPEFUL FEELING IN COMMERCIAL CIRCLES—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—EXPLOSIVES—UNION'S FEBRUARY TRADE RETURNS—PROPOSED WAGE REDUCTION ON THE MINES—SOUTH AFRICAN FREIGHTS—OIL AND NEW PRICES—RAILWAY AND HARBOUR EARNINGS FOR WEEK ENDED MAY 14—EFFECTS OF COAL STRIKE—WAGE ARBITRATIONS—METAL MARKET.

General Position.

Business this week, curtailed by the holiday, has been very quiet and of a restricted character. Although nominally prices remain unchanged some of the heavier lines, particularly in mining material, are weaker, and the tendency generally is to ease off. A prominent importer, who received cabled quotations this week for material from Home, says the works are quoting from 7 to 21 days' delivery after the strike is settled, and appear very anxious to do business. The Commercial Exchange has again shown little activity beyond a few forced sales on the part of speculators, etc. But with all the present dulness a better undercurrent is apparent—a feeling that we are gradually moving towards better times, which seems to be based on solid foundations. Merchants are confident, although trade is extremely dull at present, owing principally to the absence of ordinary buying on the part of consumers, such as the mines, that as soon as the latter start buying again their normal requirements—as they must sooner or later—prices will harden. Owing to the coal strike and other factors, materials are rising in price in Britain. Linseed oils, during the past fortnight or three weeks have gone up about 8d. a gallon; tin has advanced within about the same period to £20 a ton, and lead has increased from £18 to £24 10s. a ton, showing that as far as raw materials are concerned the market has at last touched bottom on the other side.

Iron and Steel.

Few transactions have been put through during the week, and apart from some forced liquidations on the part of speculators the amount of business done was very small. Generally all lines are inclined to go easier, more especially heavy mining material stocks. In a market like the present it is somewhat difficult to obtain standard prices, these fluctuating from day to day, and sometimes from hour to hour, but the following quotations are approximately those at present ruling: Dunswart, 29s.; Union Steel Corporation, Ltd., ordinary sized rounds, flats, and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. 6d. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 55s.; ⅜ in. iron, 40s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s. 6d.; ⅞ in. to 2 in., rounds, 39s. 6d.; larger sizes, 52s. 6d. to 62s. 6d.; ¼ in. square iron, 60s.; ⅜ in., 47s. 6d.; ½ in. to 2 in. square iron, 38s. 6d.; larger sizes, 45s. to 52s. 6d.; square mild steel, ⅝ in., 41s. 6d.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. 6d. to 64s.; channels and joists, 47s. 6d. to 48s. 6d.; imported angles, 45s. 6d. to 47s. 6d.; ¾ in., 10¾d.; ⅞ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in. ¼ in., ½ in., 9½d per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d.; per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. 6d. to 57s. 6d.; shovels, 65s. to 70s.; wheelbarrows, 70s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d.; per 98 lb. coils, 24s. to 25s. per 68 lb. coils; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb.; tin, £20 per ton; lead, £24 10s. per ton; linseed oils have advanced about 8d. per gallon. The price for steel at Home is hardening. There is a fair demand for galvanised iron piping, and ½ in. is ruling at about 6d. to 7d. per foot.

Engineering Shops.

Things in town are generally improving; a prominent engineer said there was now a more hopeful feeling than for some time past. It was sincerely to be hoped, he said, that local labourites would drop all idea of the Chamber of Mines and the big houses bluffing the miners when they threatened to close down the low-grade mines, and that they would sensibly face the only possible solution and accept a lower remuneration, as everybody else is compelled to do to-day, and reduce their expenses to the lower level of wages. There is not a business man in South Africa who has not cut down his expenses, and labour must follow suit.

Timber and Building Materials.

There is very little activity being shown in the building trade at present, inquiries being limited; prices are nominally the same, but the tendency is slightly weaker; stocks are abundant and continue to arrive steadily. 3 x 9 deals are 1s. 4d. to 1s. 5d. (a drop of about 1d.); scantlings, 1s. 5d. to 1s. 5½d. (a fall of ½d.); floorings, 8¾d. to 9d. (a decline of ½d.); ceilings, 6d. to 6¼d. (¼d. to ½d. weaker); oregon and pitch pine, 9s. to 9s. 6d. (about 6d. easier); beaver board, 5d.; corrugated iron, 24 gauge, 10d. to 1s. Furniture timber: Japanese oak, 1 in. to 2 in., 1s. 9d. per sq. ft.; Burmah teak, 20s. to 21s. 6d.; American oak, 1 in. to 3 in., 1s. 6d. to 1s. 7d. per super; American black walnut, 1 in. to 4in., 1s. 8d. per super; West African mahogany, 1 in. upwards, 2s. 2d. to 2s. 3d per sq. ft.; 3-ply ash, 5 m.m., 10d. per super. Bricks are unchanged at 70s. for stock, 60s. for mixed, £4 10s. to £5 for wire cuts, and £5 for pressed per 1,000 at kiln; white lime, 7s.; unslaked, 10s. 6d.; blue lime, 4s. 6d.; blue plaster lime, 5s. 6d.; cement, 11s. 6d. a bag; damp course and roofing, 1-ply 37s. 6d., 2-ply 47s., 3-ply 55s. 3d.

Business in the second-hand iron and timber yards has improved slightly during the past few days, and dealers appear to be in more hopeful mood. Stocks are now plentiful and are coming in fairly freely; timber is 1s. to 1s. 2d.; iron, 7d. to 8d.; casements from 9s. to 25s.; doors, new, 35s. and upwards; mouldings from 2½d.

Electrical Goods.

There is little fresh to report under this heading. Business is fair in town and quite satisfactory along the Reef; orders also are coming in steadily from outside districts. Dealers have now full stocks in nearly all lines and new supplies are coming in regularly. Prices remain unchanged at the moment, but the tendency is for them to harden in face of latest Home quotations.

Explosives.

The British South African Explosives Co., Ltd., have recently fixed up a new contract with the mines for supplying explosives from their Modderfontein factory, by which the latter will get the benefit of any reductions in the cost of materials, etc. There is no immediate likelihood of any fall in prices, but as soon as these come about, as well as any reduction in shipping freights, etc., the mines will benefit thereby; final prices being determined at the end of each year.

Safety Fuse: The price of fuse has recently been reduced by one penny per coil, and is now 10d. per coil, less 2½ per cent.; special sinking fuse, ½d. per coil extra. The company holds in Johannesburg a six-months' stock of fuse, and anticipates that the present reduced prices of raw materials will be maintained and enable a further reduction in price being made about the middle of the year. The charge of 1s. 9d. per case in connection with delivery, previously made by the company, has now been eliminated.

Union's February Trade Returns.

These show a big falling off. The value of South African produce sent oversea was £4,546,907, a decrease of £3,270,000 compared with February, 1920. In the first two months of 1921 the Union's exports totalled £8,534,119, against £19,390,920 in the first two months of 1920. The principal decreases were diamonds by £1,500,000; gold by £850,000, and wool by nearly £7,000,000. Amongst the few increases was coal to the amount of £240,000. February's imports show a drop of over £900,000 compared with the corresponding month of last year, but the total for January and February was £11,859,467, an increase of £800,000 on the first two months of 1920. In January and February of 1920 our imports of food and drink amounted in value to £1,761,339; in the corresponding period of this year they fell to £677,331, which is accounted for by the tremendous rush of foodstuffs into the Union during the previous period having been stemmed. The imports in February, 1921, totalled £302,949 against £1,158,846 in February, 1920. In the first two months of this year imported grain and meal dropped by over £500,000, and meats by £25,000. The largest decreases were in cotton goods, hardware, cutlery and leather goods. There were increased imports of wood and timber, iron and steel manufactures, dairy utensils, ploughs and harrows, machinery and oils. Satisfactory increases occurred also in farm implements and machinery of all kinds. In the first two months of this year only 842 motor cars came in, compared with 1,935 last year, but motor bicycles increased to 672 as against 620.

Proposed Wage Reduction on the Mines.

A most important conference is to be held between employers and employees' representatives, when the Chamber of Mines will propose to the Department of Mining Industry of the South African Industrial Federation a reduction in wages along the Reef. The Chamber submits that when the last increase to workers was granted the price of gold was 127s. 6d. per oz., whereas it is now under 103s., since which time also the cost of living has fallen by 18 per cent. In view of the steady decline in the price of gold during the past few months and the inevitable return to normal value sooner or later, a revision in the present high standard of wages is imperatively called for if some of our low-grade propositions are to continue working. The tendency at the moment and in the immediate future is for the cost of stores to decline, and should this go hand in hand with a corresponding reduction in wages, some of our poorer mines may be able to weather the storm. The reports issued with regard to the E.R.P.M. and other mines during the past week or so show that some drastic action must be taken in respect of wages and other costs if these concerns are to be kept alive.

South African Freights.

The South African Trade Association and the South African Section of the London Chamber of Commerce have now obtained from the Conference shipping lines running to Union ports the following freight reductions. These reductions have been necessitated by the competition of the Netherlands-South African Shipping Co., which, supported by a Government subsidy, is making a bold bid to capture South African trade from Continental ports. Aluminium ware, present rate 90s., new rate 60s.; barrows, 90s., 70s.; common brushware, 90s., 70s.; iron bedsteads, 90s., 70s.; bolts and nuts, 70s., 50s.; packed bricks, 70s., 50s.; loose bricks, 80s., 60s.; cardboard and common wood boxes, 70s., 50s.; cement, other than Portland, 90s., 60s.; dry cells, 90s., 70s.; copperas, 70s., 50s.; carts, 90s., 70s.; bentwood chairs, 90s., 60s.; empty cisterns, 90s., 50s.; cork, 70s., 50s.; cotton waste, 90s., 70s.; empty casks, drums or puncheons, 35s., 30s.; chains, 90s., 70s.; fencing standards, etc., 70s., 50s.; fire bars, 70s., 50s.; roofing felt, 90s., 70s.; grease, 90s., 70s.; wooden handles, 90s., 70s.; iron and steel, as enumerated, 70s., 50s.; ironware, 90s. 70s.; electric lamps, 90s., 70s.; pig iron, 90s., 50s.; red and white lead, 90s., 70s.; machinery, 90s., 70s.; paint, 90s., 70s.; earthenware pipes, 70s., 50s.; shoes and dies, 70s., 50s.; spades, shovels and forks, 70s., 50s.; empty tanks (not parts of machinery), 70s., 50s.; timber, 90s., 70s.; tallow, 90s., 70s.; tinplates, 90s., 70s.,; tar and pitch, 70s., 50s.; twine, 90s., 70s.; iron and steel wire, 70s., 50s.; barbed wire, 70s., 50s.; wire netting, 70s., 50s.; zinc sheets, 90s., 60s.; dangerous goods, 170s., 150s. No reductions are to be allowed on tip trucks, 60s.; cast iron pipes, underground gas, 6 in., 60s.; 12 in., 70s.; rails and accessories, 35s.; timber and sleepers (creosoted), 55s.; sleepers not creosoted, 50s.; English timber in logs, 70s.; sulphuric acid, 130s. The new rates for Portland cement are Capetown and Algoa Bay, 20s.; Mossel Bay, East London and Natal, 22s. 6d.; Delagoa Bay, 25s.; Beira, 30s. All the above reductions became operative as from 23rd inst.

Development of Oil Supply in Britain.

A British oil company, it is reported, is erecting a huge plant, within easy distance of an important port, for the storage and refining of oil. Between the plant and the port a pipe line has been constructed, and the first cargo of oil from a tank steamer was recently sent along the pipe. The cost of the scheme is £1,000,000, which speaks for the importance of this development of oil supply in Great Britain.

New Oil Prices.

The following new prices for petrol, etc., have been gazetted, viz.: Wholesale at the ports the price is not to exceed 32s. 3d. per case of two tins, or 34s. 9d. per drum of 8⅓ galls.; Shell brand, 38s. 3d. per case of eight tins; Pegasus, 35s. 9d. per case of two tins; Zenith, 36s. 3d. per case of two tins. Elsewhere the cost of transport and railage is to be added. Retail prices at the ports: All brands (2 4-gall. tins), prices as above, plus 15 per cent.; smaller quantities in bulk at the rate of 5s. per imp. gall., and in respect of gallon tins, Shell brand, 5s. 9d.; Pegasus, 4s. 6d.; Zenith, 4s. 6d. Elsewhere all brands 32s. 3d. per case of two tins, plus 15 per cent., plus transport charges and railage, or 34s. 9d. per drum of 8⅓ imp. galls., plus transport charges and railage; smaller quantities in bulk at the rate of 5s. 9d. per imp. gall., and in respect of gallon tins, Shell, 6s. per tin; Pegasus, 4s. 9d. per tin; Zenith, 4s. 9d. per tin. Maximum prices for paraffin are fixed as follow: At the ports, wholesale, 21s. 9d. per case of two 4 1-6 gall. tins, or 26s. 3d. per case of ten small tins. Elsewhere plus cost of transport and railage. Retail prices: At the ports and all centres less than 400 miles from any port, 24s. per case of two large tins, or 29s. per case of ten small tins, or 2s. 11d. per tin, plus railage and transport charges. At places in the Union beyond 400 miles from ports, 24s. 3d. per case of two large tins, 12s. 6d. for one tin, or 29s. 3d. per case of ten tins, plus railage and transport charges. The above applies to 150 degree oil, the price for 125 being 3d. per case less. Prices for paraffin per bottle (excluding bottle), at the ports 6d., elsewhere 8d.

S.A.R. and Harbours Earnings for Week ended May 14.

The approximate railway earnings were £409,715, about £25,000 below the weekly estimates, the harbours approximate earnings were £24,457, about £1,400 above the weekly estimates.

Effects of the Coal Strike.

The depression in the labour market in Britain, exceptionally severe as it was in March, became more acute last month. It is reported that on April 30 1,200,000 miners were idle, 2,000,000 other workers were unemployed, and over 1,000,000 were on short time.

The manufacture of iron and steel goods has to a very great extent ceased, and cannot be resumed until coal supplies are replenished. There is little hope of improving the tinplate industry in Wales till the strike is over.

Continental consumers are being adequately supplied with coal—formerly largely furnished by Britain—from Belgium, France, and the United States, and are not being incommoded by the stoppage of the British mines. The difficulty in recovering this trade later on need not be dwelt upon.

British Shipping.

British firms, in consequence of the low prices following the slump in freights, and in order to prevent tonnage going abroad and ultimately returning into German possession, are buying up ex-German steamers allotted to Britain by the Reparations Commission. Recently nine large vessels have thus been acquired, which are to be laid up awaiting better times.

Wage Arbitrations.

The marine workers in America, who struck on a proposed reduction of wages by 15 per cent., have now empowered the Secretary for Labour to accept such wage reductions as he deems proper.

The wages dispute at Southampton shipyards has been settled; the electricians are resuming work at the reduced wages which the other workers had already accepted.

The Belgian Senate has passed a Bill providing for an eight-hour working day and a forty-eight-hour week.

Further Decline in British Food and Clothing.

The British Labour Minister reports that retail prices on April 30 were 128 per cent. above the pre-War level, compared with 133 per cent. at the end of March. The reductions were chiefly in food, but there was also a fall in the price of clothing.

SILVER PRODUCTION IN THE UNITED STATES.

The silver production of the United States last year is estimated at 56,564,504 oz., out of the world's total output of 165,000,000 oz. Thus (says the "Mining and Scientific Press") our production of silver in 1920 was almost exactly equal to that of 1919, the difference of 17,941 oz. being within the limits of statistical error. Likewise the world's production of silver decreased only slightly, the difference being estimated at 10,000,000 oz. This shows how much the steadiness of the supply contrasted with the vagaries of demand, for the price of silver ranged between 1.38½ dollars and 59½ cents during the past year. The world's consumption of silver in 1920 for coinage alone is estimated at 225,000,000 oz., which compares with 200,000,000 oz. in 1919 and 238,000,000 oz. in 1918. To these totals may be added about 125,000,000 oz. annually for industrial purposes. Evidently the production is considerably less than the consumption, but the remelting of large quantities of silver in various forms and from diverse sources renders it impossible to make a direct and trustworthy comparison. On the whole, however, the evidence of trade statistics favours an optimistic view of the probable future course of market quotations.

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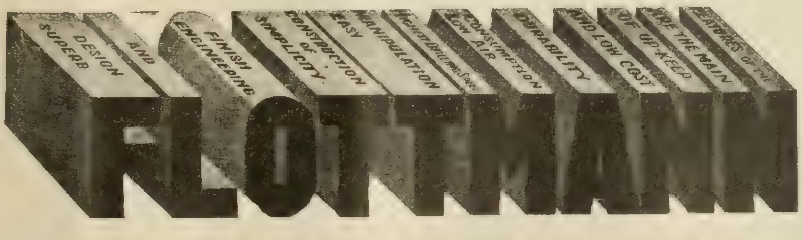

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The Week's Meetings.

THE E.R.P.M.

Question of Closing Down.

At the annual general meeting of the East Rand Proprietary Mines, Ltd., on May 20 Sir Harry Ross Skinner said: When I addressed you in May last I expressed the very great anxiety which the board felt in regard to the possibility of the operations of the company coming to an early termination in view of the monthly losses which were then being incurred. These anxieties were fortunately relieved by an appreciable recovery in the price of gold in the second half of last year, as also by the favourable turn in the exchange rates on the remittance to South Africa of the proceeds of gold sold in London. The vital importance of these factors is well illustrated by the following comparison of the value per fine ounce in the first and the second half of the year:

Declared net value per fine oz. for first six months of year 1920, 105s. 6d., less 6s., realisation charges (exchange): 99s. 6d.

Declared net value per fine oz. last six months of year 1920, 113s. 5d.; add 5d. exchange: 113s. 10d

Cost of production per fine oz. first six months of year 1920, 100s.

Cost of production per fine oz. last six months of year 1920, 101s. 5d.

You have thus an average difference in value of no less than 14s. 4d. per ounce which on the output for the second half of the year gave an increased revenue of £135,893—a very appreciable sum.

I should explain that in this comparison I have only dealt with the monthly published results, as the adjustment of gold revenue made in the annual accounts cannot be accurately allocated over the two periods, and, in any case, would not affect the comparison materially.

Unfortunately the price of gold at the moment is again at a much lower level than it was during the latter half of last year.

Financial Position Improved.

A pleasing feature of the accounts is that the financial position of the company has not only been maintained, but has been improved upon. At the end of the financial year the balance to the credit of appropriation account was £494,528, as against £427,786 at the end of the previous year, an improvement of £66,742.

The following tabulation presents the financial position plainly, and enables shareholders to see the cash resources of the company as at December 31 last:

Cash in hand, sundry investments, gold on consignment, sundry debtors, stores and materials, etc., amounted to … … … …	£1,059,118
Less liabilities (other than debenture and annuity accounts … … … … … …	183,190
Leaving a balance of cash and cash assets of … …	£875,928

an increase of £78,891 on last year. Against this figure of £875,928 there are the unredeemed debentures representing a face value of £693,780, and the balance due on Government annuity account, viz., £61,485, together £755,265; moreover, in the event of the mine having to suspend operations a liability will have to be faced to the Miners' Compensation Fund of a sum which is estimated at between £150,000 and £200,000. You will thus note that the liabilities, actual and prospective, exceed the immediate cash assets. It must not be forgotten, however, that a substantial portion of the outstanding debentures will probably be redeemed at less than face value, so that this shortfall should disappear, if indeed it be not converted into a surplus. And, of course, the plant and equipment represent a realisable asset of great value. Last year we were able to save the considerable sum of £24,289 on the £95,190 debentures purchased.

Working Profit for Year.

The working profit for the year was £192,994, which includes all adjustments on gold account up to September 30, 1920, a decrease of £110,822 on the previous year. The expenditure on donations, debenture interest, directors' and auditors' fees, and the amount written off investments in British Government securities amounted to £71,656: while sundry receipts (i.e., interest, etc.) amounted to £31,025, leaving a sum of £152,363 transferred to appropriation account, which account, as already pointed out, shows an improvement of £66,742 on 1919.

I might draw your special attention to the item in the balance sheet entitled "Shares and interest in co-operative and other concerns." The amount invested is £29,913, as against £18,660 in 1919. The increase is due to the following purchases:

2,267 shares in the Transvaal Wholesale, Ltd., of a nominal value of £1 each	£2,267
2,635 shares in the Rand Refinery, Ltd., of a nominal value of £1 each	2,635
6,060 debentures in Rand Refinery, Ltd., bearing interest at 8 per cent. per annum . . .	6,060
Sundry adjustments in other concerns associated with the industry .	291
	£11,253

The first named company was formed to provide facilities for co-operative societies amongst employes on the mines to enable them to obtain their supplies upon as advantageous terms as possible.

In terms of the arrangement concluded by the Chamber of Mines with the Government, the Chamber has proceeded uith the erection of the refinery, which is situated near Germiston. The sums mentioned, amounting to £8,695, represent your company's share of the cost.

Working Results.

The tonnage milled for the year was 1,460,000, yielding 400,496 fine ounces, of a value of £2,209,536, equal to 30s. 3.2d. per ton milled. The working costs amounted to £2,016,542, averaging 27s. 7.5d. per ton milled, or 4s. 1.6d. per ton milled in excess of the cost of the previous year, due to the further large increase in wages and stores and to additional development footage. The total average cost per fine ounce recovered for the year was 100s. 8d., and the revenue 110s. 4d., leaving a margin of 9s. 8d. per ounce as the working profit. The average value of the yield was increased by the price received for gold above standard rates to the extent of 7s. 8.6d. per ton—i.e., from 22s. 6.6d. to 30s. 3.2d.

The cost per ton milled from 1914 to date was as follows:—

1914 … … … … … …	19s. 4d.
1915 …	19s. 1d.
1916	19s. 3d.
1917 … … … … … …	19s. 9d.
1918 … … … … … …	22s. 6d.
1919 … … … … … …	23s. 6d.
1920 … … … … … …	27s. 7d.
1921 (four months) …	28s. 0d.

There is thus a difference between 1914 and 1920 of 8s. 3d. per ton (and this with development seriously curtailed), due, as you are aware, to the high white wages, to the increased native wages, and to the heavy increases in the prices of stores and to a certain decrease in efficiency. The average wage per white employe per month in 1914 was £28.6, and in 1920 £42.2, a difference of £13.6. The whites employed in 1920, taken at 1914 average rate, would have earned £226,869 less.

Increased Price of Stores.

To appreciate the extent of the increase in the price of stores, I quote a number of items which show an increase of 100 per cent. or over:

Candles: 1914, 4¼d. lb; 1920, 1s. 1¾d. lb.

Fuse: 1914, 8s. 6¼d. pkt.; 1920, 22s. 10d. pkt.

Caps: 1914, 2s. 9½d.box; 1920, 5s. 3d. box.

Mercury: 1914, £9 10s. (jars); 1920, £22 13s. 6d. (jars).

Steel, bar: 1914, 2⅝d. lb; 1920, 5½d. lb.

Steel, plate: 1914, 1⅞d. lb.; 1920, 5¾d. lb.

Shovels: 1914, 2s. 2½d. each; 1920, 6s. 9d. each.

Picks: 1914, 1s. 6d. each; 1920, 5s. 3d each.

Zinc: 1914, 38s. per cent.; 1920, 76s. 4d. per cent.

The average monthly earnings of the natives, exclusive of housing, food, medical attendance, etc., was in 1914 £67,677 less than in 1920, assuming an equal number of shifts worked.

Another important factor which greatly increases the costs is the scattered nature of our pay ore, indicated in yellow on the plan accompanying the report. This can be readily understood when one appreciates the large area requiring supervision, the time entailed in getting to the working points, the enormous distances the rock has to be trammed, and the cost of maintaining the lengthy tracks, air mains, etc. Furthermore, owing again to the large area from which rock has to be won, no less than five main shafts, three small surface shafts, and five subsidiary sub-inclines have to be kept in commission to deal with the monthly tonnage.

Development Programme.

The 1920 programme of development, taking into account losses in the earlier months of the year, was a comprehensive one, and is exhaustively dealt with in the consulting engineer's report, to which I would specially draw your attention. Influenced, however, by the increased price of gold, and actuated by the strong desire to discover payable areas of sufficient extent materially to affect the future of the mine, it was felt that it was the right and proper course to pursue. As was the case last year, only those areas which held out reasonable promise of exposing pay tonnage were dealt with. The failure to achieve the desired object adds another disappointment to the many which we have experienced in our persistent endeavours to secure a future for this large and important corporation.

Development was confined principally to the following portions of the mine:

Driefontein section.

The lowest portion of the Hercules section.

The Cason-Cinderella section.

The footage driven in these selected areas amounted to 18,566 feet, of which 14,000 feet were sampled, and 6,390 feet payable. This footage, together with stope faces advanced into areas not previously included in ore reserves, disclosed 424,470 tons of payable ore of a value of 7.3 dwts.

For the current year, owing to the heavy loss in January and February a curtailment in development was, in conformity with the policy indicated to you in my last address, decided up, and put into effect. The results, January to February inclusive, are: Footage driven, 5,440ft.; footage sampled, 3,475ft., and of the latter figure 1,675ft. or 48.2 per cent. exposed payable ore of a value of 458in.-dwt. or almost 8dwt. over a 58in. stoping width.

These figures have the appearance of being favourable, but one has to remember that they are obtained from selected portions of selected areas, i.e., ground doubly selected, and ground which is now very limited in extent. In connection with development I must emphasise—and the Government mining engineer's attention was drawn to the fact on his recent visit to the mine—the really enormous amount of unpayable and what might be called exploratory development which has in years past been carried out in the various areas. We can safely say that we have left no stone unturned in our efforts to inform ourselves of the possibility of having stretches of payable ore in the accessible ground within our boundaries.

Ore Reserve and Pumping.

The ore reserve at December 31 was 2,410,850 tons of a value of 6.1dwt. which is a decrease of respectively 223,500 tons and .2 of a dwt. on the previous year.

The small encroachment on the reserve was not due to the replacement of pay ore which was only 424,740 tons, but to the fact that, owing to the large quantity of rock obtained from reclamation, the reserve was not drawn on to the extent which it otherwise must have been.

While on the subject of the ore reserve I might correct an erroneous impression so often met with, that it is impossible for a company profitably to extract practically the last ton of its pay reserve before closing down. This is entirely fallacious. For instance this company took over the Ginsberg Company's claims after that company had cleaned up its mine as far as was possible and profitable. However, we find that, scattered throughout that small property there had been left some 100,000 tons of pay reserve, which, whilst impossible for the Ginberg, is quite possible for us profitably to extract in combination with our large tonnages. Now, if such a tonnage has to be left behind in a small mine, one must assume that in a vast mine such as the East Rand Proprietary a correspondingly larger amount will ultimately have to remain unextracted.

The obvious reason is that the number of payable working points are so reduced that the tonnage which can be extracted within a limited time therefrom will be wholly insufficient to meet all charges. This point has to be borne in mind when applying the ore reserve figures to the prospective life of, our mine.

The total quantity of water raised was 886,331,000 gallons, equal to 2,428,304 gallons per day at a cost of £108,725. This is a heavy burden on the company, being equivalent to 56.33 per cent of the working profit.

Unfortunately as the company is working at a greater depth than its western neighbours, it has to pay the penalty therefor, inasmuch as it drains the surrounding country, to the distinct advantage of these mines.

This is a matter dealt with later by me in connection with the Commission appointed by the Government to inquire into the measures of relief which can be adopted in respect of the East Rand Proprietary Mines.

The native labour supply, while short of our full requirements, was maintained at a level which did not seriously prejudice operations, and since the close of the year has shown a marked and satisfactory improvement. In December, 1920, the number of natives in the employ was 11,258; at the end of April it was 12,749.

The health of the natives has been very satisfactory, the death rate from disease per 1,000 being 14.2 and from accidents 3.5; the latter being a record for the company, and the former is only 1.1 higher than the record of 1917.

What of the Future?

Now as to the future. Shareholders may well ask what efforts have recently been made, if not with the expectation of profit, at least with the object of keeping things alive. From the shareholder's point of view, one is compelled to answer that a great deal has been tried but little effected. In fact, the keeping of the mine alive to-day is more in the interests of the Government, the employes and the community generally than of the shareholder. In May last year, in co-operation with our employes, we were able to effect a substantial reduction in numbers of some hundred men; also by a re-arrangement in the nature of overlapping of the working hours of our underground white supervisors, to increase our efficiency considerably. However, when the price of gold and profits increased in the second half of the year, our workmen pressed us to revert to their former system of working.

With the sharp decline in the price of gold, and the consequent heavy loss incurred in January, it became quite apparent that a monthly milling tonnage of less than 130,000 to 140,000 tons at the present grade would not yield sufficient gold to pay the cost of production. In January, 1921, the cost of producing an ounce of fine gold was £6 0s. 10d., and the value was 105s., being a loss of 15s. 10d. per ounce, or £24,256 for the month. If this increased tonnage could not be secured with the existing labour force, serious retrenchment was the only alternative step. In our endeavour to meet the position, our workmen again agreed to revert to the overlapping system of shifts, and that one-half of the white employes in charge of underground gangs of natives go down an hour and a half earlier in the morning for three days of the week and the other half the other three days.

Not More Than 48 Hours.

This does not mean that any white employe has to work more than the legal 48 hours per week, but the 48 hours is divided into three long and three short shifts. It does mean that the native worker is allowed some additional hour or so in which to perform his task, instead of having to rush it through in some five hours as formerly. I am glad to say the idea met with unanimous response. The change was introduced towards the end of February and the results for March and April, although not wholly attributable to the early morning shift (there were 1,000 more underground natives in April than in January), are a decided improvement on those of January and February. I should mention that the reason why it is necessary for a proportion of white men to go down earlier is in order to comply with a provision in the Mining Regulations which prohibits natives entering any working place before it has been inspected by a ganger for the purpose of satisfying himself that it is safe before permitting the natives to start work. A modification of this regulation has at various times been sought, but hitherto without success.

Efficiency Must be Maintained.

Under existing conditions it is hardly necessary for me to state that it is imperative that the present efficiency must be more than maintained, and any slackening of efforts resulting in a fall in the production, unfortunately can only lead to one end. Let me here emphasise as strongly as I possibly can that the maintenance of production at a high level reacts more to the advantage of our employes than to that of the management and the shareholders. I venture to think that this is appreciated by a large number of our employes, and I am confident that in the event of circumstances arising—which unfortunately may occur at any time—jeopardising the continuance of operations and necessitating more drastic measures than have been taken up till now, the employes will show the same reasonable spirit of compromise as has marked their attitude in the past, in order that the life of the mine may be prolonged as far as possible.

May I here remind you of the strong recommendations made to the Government by the Low Grade Mines Commission in the matter of the official measures which should be taken to afford relief to the poorer mines. These recommendations, as you will have seen, have been emphatically confirmed by another Government Commission, namely, the Unemployment Commission. I do not know what steps the Government propose to take in this matter, but we can surely expect that the recommendations of two such important Commissions will not be ignored.

Commission of Engineers.

Feeling that the Government cannot divest itself of responsibility as regards the serious condition of such mines as the E.R.P.M., we asked the Government Mining Engineer to join us in a visit to the property for the purpose of studying on the mine the very real difficulties with which we are faced. Accordingly, on February 9 last, Sir Robert Kotze, accompanied by Colonel Bottomley, Inspector of Mines for the district, went jointly over the plans and prospects with various representatives of the Board, the Consulting Engineer and General Manager.

Following this visit a meeting was held on March 2, 1921, presided over by the Government Mining Engineer and attended by the Principals and Technical Representatives of the various companies likely to be affected by the closing down of this mine and the consequent cessation of pumping operations. At this meeting its was decided that as a preliminary measure the Minister of Mines be asked to appoint a Commission of Engineers, representative of the companies concerned, to inquire into the whole position, having particularly in view the possibility of the lengthening of the life of your mine.

Such a commission was appointed by the Government on March 12, 1921, the terms of reference being:-

1. The possibility of the East Rand Proprietary Mines, Limited, being closed down and any practical measures which may be adopted to prevent or delay such closing down, whether by agreement with the owners of neighbouring properties or otherwise.
2. The immediate or ultimate effect of the closing down of the East Rand Proprietary Mines upon the working of neighbouring mines.
3. The posibility of arranging contributions towards the cost of carrying out the necessary pumping operations in the East Rand Proprietary Mines by the owners of neighbouring mines and in what manner such contributions should be assessed.

Reports and Suggestions.

Two reports have been submitted:-

The majority report is signed by:—

C. E. Button, Inspector of Mines, Germiston District, Chairman.

F. H. P. Creswell, representing Witwatersrand Deep, Ltd.

E. Hay, representing Cinderella Consolidated Gold Mines, Ltd.

C. K. Thomas, representing Witwatersrand Gold Mining Company, Ltd.,

and the minority by:—

A. J. Brett, representing Geldenhuis Deep, Ltd., and Rose Deep, Ltd.

E. C. J. Meyer, representing East Rand Proprietary Mines, Ltd.

D. Wilkinson, representing Simmer and Jack Proprietary Mines, Ltd.

and which have been duly published and will form an annexure to my address.

Various suggestions were considered with a view to preventing or delaying the closing of the mine, and they may be summarised as follows:

(a) Selective mining.

(b) The acquiring by this company of a small portion of the properties of the Cinderella on the east, and the Witwatersrand on the west.

(c) Reduction of white wages, stores, and relief in other directions.

(d) The dismemberment of the East Rand Proprietary Mines, Ltd., i.e., the acquisition by the Witwatersrand Deep of the western section (the more profitable section) of your mine, and the purchase by the East Rand Proprietary Mines (or amalgamation therewith) of the Cinderella Consolidated Gold Mines, Ltd.

(e) The absorption by this company of the Witwatersrand Deep, Ltd., and of the Cinderella Consolidated Gold Mines, Ltd.

In regard to (a) the commission were unanimous that this was economically impracticable.

With regard to (b) the commission were in agreement that the limited tonnage which could be secured from the small areas suggested would not assist the position to any appreciable extent.

The third suggestion (c) is dismissed by the majority report on the grounds that owing to the vast extent of the property necessitating the maintenence of so many shafts, the abnormal quantity of water which has to be dealt with and for other reasons it would not be possible to effect such economies as would materially reduce the costs.

On the other hand, from the minority report it would appear that considerable relief could be looked for in the direction of reduction in costs, principally in stores and white wages. Furthermore, the conversion of exhausted claims held under diggers' licences to prospectors would involve a saving of approximately £12,000 per annum. These items together, allowing the reductions estimated in the minority report to be feasible, would reduce costs by approximately £200,000 per annum. I need hardly say that if this could be accomplished it would certainly, more than anything elsewhere suggested, postpone the date of closing.

Suicidal for the Company.

The fourth suggestion (d) advocated in the majority report is strenuously opposed in the minority. A careful perusal of the arguments brought to bear on this point leads one to no other conclusion than that it would be suicidal for this company, in its own interests, as well as that of every one concerned, including the community, to adopt the suggestion of the majority report. The objections to this suggestion seem to me very convincing and are clearly enumerated in the minority report.

With regard to the last suggestion, viz.:—the absorption by this company of its immediate neighbours, the reports are in agreement that some such scheme is at least worthy of consideration with a view to prolonging the life of the mine. In this connection I wish to state that this company is prepared to consider any scheme which has a fair and reasonable prospect of achieving that object, and which will, at the same time, bear investigation from an economic point of view.

Government and Pumping Charges

The final recommendation in both reports that failing other arrangements the Government guarantee the company against loss in respect of its pumping charges I very strongly endorse, and trust that it will receive favourable consideration on the part of the Government, who, after all, have much more to gain from a prolongation of life than the shareholders. Should nothing result from the various suggestions put forward, which I sincerely trust will not be the case, then the position can be summarised as follows:—

(a) That east of the Driefontein section and above what is known as the water zone there are no new areas which could be opened up with any hope of securing payable tonnage of any consequence.

(b) That the fine points in the mine in which development is still being carried on in the areas indicated are wholly insufficient to add materially to the ore reserve.

(c) That it is thus now purely a question of how long the present ore reserve, with the small monthly additions, taken in conjunction with the reclamation ore, which has on an average been providing approximately 40 per cent. of the rock milled, will permit of profitable working.

This, it is quite impossible to forecast, and any attempt would be wholly unreliable, so much depending: Firstly on the price of gold, which is of such a fluctuating nature; secondly on the reclamation ore available and its value, and thirdly on the maintenance of production at a high level. However, one might venture to say that assuming present conditions prevail the mine will not cease operations before the end of the current year.

In conclusion, I desire to place on record the board's appreciation of the valuable services rendered during the year by the late consulting engineer, Mr. E. H. Clifford, the general manager, Mr. Meyer, and both mine and head office staffs. Mr. Clifford, as you no doubt know, has severed his connection with the Rand, and I am sure I shall be voicing the feeling of the meeting when I say that we regret very much the loss of the benefit of Mr. Clifford's sound and experienced advice, and that we wish him good fortune in whatever sphere he may choose to use his outstanding abilities.

I beg to move the adoption of the report and accounts.

Mr. F. C. Dumat seconded the motion. They had heard, he said, such an exhaustive report concerning the position of the mine, a clear description of the accounts, and all the details in respect to the management of the mine, that there was no necessity for him to add anything to the very interesting and able address delivered by the chairman.

Mr. Aubrey Hyman said he was very sorry to see the company in such a bad position, and he was certain that the chairman and directors had done everything they could in the matter of improving the situation. It was a most unfortunate state of affairs and he trusted that some way would be found out of the difficulty, because it was one of the worst things that had happened on the Rand for a great many years. It would certainly be fatal if the mine were to be shut down, and if it were a lot of others might do likewise.

ROSE DEEP, LTD.

The Rose Deep, Ltd., held their annual meeting on May 19 in the Board Room, Corner House. Mr. F. Raleigh, chairman, said: The accounts before you show the working profit to have been £221,018, which is an increase of £22,869 above that of 1919. After allowing for interest, sundry revenue, sales of plant and depreciation, an additional net sum of £1,663 was received, bringing the total to be accounted for to £222,681. Government and provincial taxation was paid, totalling £31,021, and two dividends were declared, totalling 27½ per cent., which absorbed £192,500, or a total of £223,521. The shortfall of £840 was taken from the previous year's profits, reducing the credit balance of appropriation account at the end of the year to £134,047. This balance is invested as follows: Stores, debtors and shares in co-operative concerns, £76,622; cash and investments, £57,425; total, £134,047. The salient points in the reports now before you are the increased tonnage treated, profit earned and dividends paid, as compared with the previous year, notwithstanding a decrease of .42dwts. per ton in the yield obtained.

Cause of Improved Results.

These improved results are chiefly due to the increased price realised for the gold, which averaged 110s. per fine oz., as against 93s. 4d. per fine oz. in 1919. On the other hand working costs have risen by a further 2s. per ton milled, and were higher than they have been for some 19 years. The cause of this further rise is due to increased cost of white wages, which accounted for 11d. per ton; coloured wages, which accounted for 5d. per ton; stores, which accounted for 5d. per ton; all other costs, 3d. per ton; total, 24d. per ton.

The Consulting Engineer reports that the wages of our white employes increased during last year over those paid for 1919 by £40,000. Under the heading of other costs the additional payments for miners' phthisis compensation amounted to £8,550, and for holiday and sick leave pay £5,150. The results—though improved—make a poor showing against those obtained prior to the war, when working costs were 4s. 7d. per ton lower than those of 1920, and the fact that any profit was earned last year was almost entirely due to the price above standard rates realised for the gold produced.

The ore reserves, on revaluation and recalculation, show the same tonnage of payable ore in reserve (three million tons) as at the end of the previous year, but their value (5.1dwts.) shows a decline of .1dwt. per ton. During the year practically 500,000 tons of payable ore were developed, of an average value of 5.4dwts. per ton. You will realise that the grade of the ore in reserve puts the mine into the category of low-grade mines. At the standard price of gold (84s. per fine oz.) the recovery value of the available payable ore reserves, with 10 per cent. sorting, works out to approximately 22s. per ton. The present working costs are, for 1920, 21s. 2d per ton, and for the first four months of this year 21s. 10½d. per ton. Shareholders can draw their own conclusions from these figures. As regards the price of gold, I think it is generally accepted that a time will arrive when this will revert to standard. When that comes about, either our costs must come down or the company will incur losses and be compelled to stop mining operations.

Necessity for Economy.

From the foregoing it will be realised that every possible economy must be effected in order to enable the mine to continue mining operations through what is likely to be a difficult period ahead of it. With this object in view, the question of closing down the 100 stamp eastern mill and concentrating reduction operations at the 200 stamp western mill is being investigated. Should it be found that this re-arrangement can be made without undue expenditure it will be possible to carry on the reduction operations more economically, and thereby improve the prospects of continuing mining operations.

Apart from this, there does not appear to be any other direction in which the economies can be effected. If we examine the manner in which the working costs of this mine, which I may say are to-day practically as low as any company on the Witwatersrand, have risen, we find there has been an increase of 4s. 3d. per ton when comparing the working costs of 1915 with those of 1920:

White wages: 1915, 4s. 8d.; 1920, 6s. 11d.; increase, 2s. 3d.; increase per cent., 48.
Coloured wages: 1915, 3s. 8d.; 1920, 3s. 9d.; increase, 1d.; increase per cent., 2.
Stores: 1915, 5s.; 1920, 6s.: increase, 1s.; increase per cent., 20.
All other costs: 1915, 3s. 7d.; 1920, 4s. 6d.; increase, 11d.; increase per cent., 25.
Total: 1915, 16s. 11d.; 1920, 21s. 2d.; increase, 4s. 3d.

Based on the tonnage milled during 1920, the increase per ton represents an increase in working costs of no less than £136,765 for the year. The additional sums paid under the heading of other costs were for miners' phthisis compensation (£12,200) and for holiday and sick leave pay (£11,500).

Sand Filling.

Sand filling last year was chiefly confined to the western section of the mine, where the whole of the 200 stamp mill's current residues were lowered into the mine. The tonnage lowered was 366,500 tons, being some 83,000 tons in excess of the previous year's figures. At the end of this month the lowering of current sands into the mine will be discontinued at the western section, owing to this section of the mine being at present unable to accommodate any further tonnage. The sand filling, however, will be recommenced at a later date. Since the close of the year the company has acquired from the Knights Deep, Ltd., which has now closed down, a strip of 28 claims on this company's southern and eastern boundaries, comprising pillars and unworked areas, for the sum of £1,000, and it is expected that a considerable tonnage of ore will be mined at a low cost from these claims by this company.

Joint Pumping Plant.

Consequent on the Knights Deep closing, the arrangement under which that company has pumped a certain amount of water, which has been allowed to flow to it from the Rose Deep workings, has been discontinued, and an arrangement has been entered into with the Simmer and Jack Proprietary Mines, Ltd., for the installation of a joint central pumping plant at that company's Rhodes shaft for dealing with both companies' mine water. Although this joint pumping plant will have a sufficient capacity to handle the water made in the Simmer and Jack, our own mine, and in the adjacent closed-down mines, together with that made in the Knight Central, Limited, should it close down, the position of our mine and the Simmer and Jack Mine might still be seriously affected should the East Rand Proprietary Mines, Limited, close down and cease pumping operations. The amount of water making in the E.R.P.M. is at the present time approximately two million gallons per day, and it is calculated that in about three years after pumping operations cease on that property, unless the inflow of water is prevented, either by the intervening companies, namely, the Witwatersrand Deep, Limited, or the Witwatersrand Gold Mining Company, Limited, or in some other way, this water will have to be dealt with by the Simmer and Jack and Rose Deep Companies in order to prevent the flooding of their mines.

Inquries About Closing Down.

A committee was recently appointed by the Department of Mines and Industries to inquire into (a) the possibility of the East Rand Proprietary Mines being closed down and any practical measures which may be adopted to prevent or delay closing; (b) the immediate or ultimate effect of the closing of the East Rand Proprietary Mines upon the working of neighbouring mines; (c) the possibility of arranging contributions towards the cost of carrying out the necessary pumping operations of the East Rand Proprietary Mines by the owners of neighbouring mines, and in which manner such contribution should be assessed. We now await the committee's report. The working profits for the first four months of the current year have averaged £6,680 per month, as against an average of £18,420 per month for the whole of last year.

Expression of Appreciation.

I desire to express the board's appreciation of the services rendered by Mr. E. H. Clifford, who has acted as consulting engineer during the past six or seven years. Mr. Clifford has recently retired from the Rand, and I am sure you will join the board in wishing him every success in his future career. The board is much indebted to Mr. Clifford for the assistance he has always afforded, and for the able manner in which he has directed the mining policy of our company.

Our thanks are also due to the manager, Mr. Arnold Milne, and to his staff and the staff at the head office for their work during the past year.

The directors' report, balance sheet, and accounts for the year ending December 31, 1920, were adopted.

DURBAN-ROODEPOORT DEEP.

At the annual meeting of the Durban-Roodepoort Deep, Ltd., Mr. F. Raleigh, who was in the chair, said:—At the last annual meeting I advised you that the board had been compelled to stop the sinking of the southern vertical shaft, and detailed the circumstances which led to this decision. I then stated that the board was not justified in carrying out the programme unless there was a reasonable hope of making profits in the near future, and that mining operations would be continued notwithstanding the losses then being made, in order to ascertain whether the mine could make profits sufficient to justify the resumption of shaft sinking. Up to that time monthly losses had been incurred, totalling £20,784 for the first five months of last year. A further loss was made for June, which brought the losses for the first half of the year to £23,294. In July the price realised for the gold produced commenced to increase, and for the remaining six months owing to the increased price working profits were made sufficient to counterbalance the losses of the first half of the year and to show a working profit of £13,683 for the year.

Question of New Shaft.

The directors' report before you advises that the work of sinking the new vertical shaft remains in abeyance and that the board intends to reconsider the position about the middle of this year, when, if the company's outlook is more favourable and that course appears to be warranted, shaft sinking might be restarted. In this connection attention was called to the fact that since the close of the year the price of gold had declined, and I may here say: that whilst an average net price of 114s. 3d. per fine ounce was realised during the latter half of last year only 103s. 9d. per fine ounce has been realised for the first four months of this year. This decline has had an adverse effect on the working results, and only £2,265 has been earned as working profit for this year to the end of last month. The company's position is receiving the very earnest attention of your directors, and it is hoped that they will be able, as forecasted in their report, to give you their recommendations regarding the company's future mining policy during next month. The continued high cost of wages and stores increases the cost of construction work to a figure much in excess of the estimates prepared when the shaft sinking programme was decided on in 1914, and the smallness of current working profits makes the position more serious than it was when the report before you was written.

The Price of Gold.

The problem before your directors is not only the question of raising the required capital to re-organise the mine on a basis to ensure cheaper working costs, but how to carry on during the three years required for completing the necessary work. Present day profit results, with gold at about 103s. per fine ounce, indicate that a further small decrease in the present price of gold would bring about heavy working losses. Should such a decline come about it is plain the board would be most seriously handicapped in any endeavour to finance the capital programme in the face of current working losses, which might possibly continue throughout the period of construction.

Regarding the accounts before you the working profit for last year is reduced to £1,750 after allowing for interest, directors' fees, donations, etc. The appropriation account shows that the small profits earned for the year, together with the balance unappropriated at the commencement of 1920, in all £20,840, has been absorbed by capital expenditure. The total capital expenditure incurred, chiefly in connection with the sinking of the new circular shaft, amounted to £34,195.

Facts and Figures.

The company's financial position is given in the directors' report, and shows that its liabilities in excess of cash on hand amount to £60,649, against which may be set the amount owing by sundry debtors, value of stores and shares in co-operative concerns—£47,294, leaving a financial liability of £13,355 at the end of the year. Full details regarding the company's operations during 1920 are given in the reports before you. The working costs increased by 2s. 6d. per ton, and had it not been for the price above standard rates realised for the gold produced, a loss of just over £100,000 would have been made on the year's working. The above increase in the working costs was incurred under the following heads:—White wages, 1s. 7d. per ton; coloured wages, 2d. per ton; stores 9d. hotal 2s. 6d. per ton. The increases based on the tonnage milled last year, are equal to an additional working expenditure of £34,650 over that of 1919. The working costs amounted to 34s. 5d. per ton, which is 11s. 1d. a ton, or 47½ per cent. above the costs of 1915, this sum is made up of :

	1915		1920		Inc. p. ton		Inc.
	s.	d.	s.	d.	s.	d.	p.c.
White wages .	6	0	11	4	5	4	88.9
Coloured wages	5	10	6	4	0	6	8.6
Stores	7	3	11	3	4	0	55.2
All other costs	4	3	5	6	1	3	29.4
	23	4	34	5	11	1	47.5

The recovery value of the ore reserves, based on standard rates for gold, is about 27s. 6d. per ton, and it will be seen that with costs averaging 34s. 5d. for 1920 and about 33s. 6d. for the first 4 months of this year, a return to standard rates for gold would mean ruin to the company, unless the working costs can be reduced and efficiency improved.

Increase in Wages.

The chief item of increased costs since 1915 is under the heading of white wages, and although a rearrangement of duties was agreed upon during last year with our employes enabling a reduction in the number of whites employed, the cost due to increased pay is nearly double what it was in 1915. The item of stores is the next largest increase, but we have reason to believe that some relief will be afforded in this direction before long. The increased cost under the heading of other costs is chiefly due to the larger assessment on account of miners' phthisis compensation which amounted to £7,100 more in 1920 than in 1915, and to the higher cost of holiday and sick leave pay which amounted to £5.100 more.

Development operations produced an estimated payable tonnage of about 200,000 tons, valued at 7.1dwt. Driving was commenced on the 15th level last year, in the south reef from two shafts. The results obtained to the end of last month were as follows:—

From west incline: Footage sampled, 1,485ft.; reef width, 5in.; value, 6.42 dwt.; inch-dwt., 321. From No. 1 incline. Footage sampled, 260ft.; reef width, 5in.; value, 34.6dwt.; inch-dwt., 173.

During the current year the 16th level south reef has been started from the west incline, the disclosures to the end of April being for the 295ft. sampled, reef width 5in., value 63.6dwt., or 318 inch-dwt. The above results are much the same as have generally been obtained from the south reef on the upper levels, and are an illustration of the remarkable continuity and regularity of value which has been characteristic of the south reef in this mine for the whole of its past history. A small amount of development has been done on the main reef on the 15th level, viz.: From west incline: Footage sampled, 85ft.; reef width, 35in.; value, 7.9dwt.; inch-dwt., 276. From No. 1 incline: Footage sampled, 120ft.; reef width, 34in.; value, 12.1dwt.; inch-dwt., 410.

The west incline is now 84 feet below the 17th level, and a crosscut has been extended towards the south reef for a distance of 40ft. The ore reserves remain practically the same in tonnage and value as at the end of 1919.

More Water to be Pumped.

The mine water of the adjoining Princess Estate and Gold Mining Company Ltd., which was closed down last year, is now flowing into our mine on our western boundary at the rate of 6½ million gallons per month, the effect of which is to increase the cost of pumping by about £800 per month. I am pleased to say that the quantity of water we are now receiving from the Princess Mine is not as large as was originally thought it would be, and that as the Roodepoort United Mine on our eastern boundary is still working, so far we have not had to deal with its water.

Our thanks are due to the consulting engineer, Mr. H. Stuart Martin, the manager, Mr. C. Glyn, and his staff for the work done during the past year.

The directors' report, balance sheet and accounts for the year ended December, 1920, were adopted.

KNIGHT CENTRAL.

Mr. F. Raleigh presided at the annual general meeting of shareholders and directors of the Knight Central Gold Mining Co., Ltd., which was held on May 20 in the Board Room, Corner House.

Mr. Raleigh, in moving the adoption of the report and accounts, said: You will, I know, have been glad to notice that the working profit earned during the past year is the highest earned by the company since 1911. It has only been exceeded twice in the history of the company. The improved results obtained are a source of gratification to your board, seeing that representations had been made to them by shareholders at recent annual meetings to wind up the company immediately. A resolution to that effect was first moved in 1918. During that year a working profit was earned of £15.639; the profit in 1919 was 17.140; whilst in 1920 the profit was £68.600; total for three years, £101,379.

This sum is increased to £106.621 when including net sundry revenue. I think shareholders will agree that these results vindicate your board's decision to carry on, because it is evident that had the representations made by certain shareholders been carried into effect over £100.000 profit would have remained unearned and thus lost to the company. On the other hand, some shareholders may contend that if the company's plant had been sold during 1918 and 1919 a higher figure would have been realised than can be expected to-day.

To them I reply that the company was formed for the purpose of working the mining area owned, and that so long as the mine could be worked at a profit it was the board's duty to shareholders, to its employes, and to the State to continue operations; moreover, there was always the possibility that the block of payable main reef ore discovered in 1917 north of the Simmer dyke might have turned out to be greater in extent than has now been proved to be the case

Financial Results.

Turning now to the financial result of the past year, the working profit earned was augmented by the difference between certain items detailed in the working revenue and expenditure account and by the proceeds (£4.788) of some plant, etc., sold during the year, bringing it up to £73.827. Of this amount £67,500 was distributed to shareholders in the form of a dividend of 7½ per cent., this being the second dividend paid by the company since its formation.

The balance to the credit of appropriation account, after providing for the dividend, was increased by £6,067 for the year, and totals £142.757. This sum is invested as follows: Net cash and investments, £111,307; stores, debtors, and shares in co-operative concerns, £31,450; total, £142,757.

Full details of the company's operations during the past year are given in the reports before you, and you will have seen that the profit earned is entirely due to the price realised for gold being above the standard rate. The consulting engineer's report shows that the costs for the year were equal to 93s. 6d. per fine ounce of gold produced, as against 110s. per fine ounce realised. At the standard price of gold (84s. per fine ounce) there would have been a loss of £40.000 for the year, based on last year's working costs.

The tonnage milled for the year showed an increase of 42,900 tons, working costs a reduction of 1s. 4d. per ton, and the working profit and improvement of £51.460 all as compared with the previous year. I informed you at the last annual meeting that the yield during 1919 was the highest obtained in the history of the mine; during the past year this showed a decrease of .6dwt. per ton.

Ore Treatment.

The company commenced the year under review with only 200,300 tons of payable ore in reserve; to that can be added 120.000 tons of payable ore of the value of 5.9dwt. developed during the year, giving a total of 320.300 tons. The tons mined during the year were 295.100, of which 124.146 tons were obtained from reclamation and other sources; we were thus enabled to start the current year with a payable ore reserve of 150,700 tons still remaining. Had it not been that the strenuous endeavours of the management to obtain a large tonnage of payable ore from reclamation and other sources met with considerable success the company would probably already have had to consider ceasing operations. The payable ore remaining in reserve is valued at 6.1dwt. being .7dwt. below the value of the previous year's reserves. At the present rate of mining the existing reserve will soon be exhauted, but it is hoped that again by the help of reclaiming in old workings the company will be enabled to mine 1,000 tons a day and to continue profitable operations for possibly the next five or six months. This forecast is dependent on the price to be realised for our gold not falling below 100s. per fine ounce, on working costs not rising above their present level, and on no serious accident or labour disturbance occurring at the mine.

With gold at the present price of 103s. per fine ounce it is impossible to obtain profits equal to those of the latter half of last year, when an average of 115s. 6d. per fine ounce was obtained; the decline in price of gold represents about £3,500 less revenue per month.

You are aware that monthly working losses were made during the first quarter of the current year. This was due to several adverse circumstances; in the early part of the quarter operations were hampered by a shortage of the underground native labour supply; in February an accident occurred in the east shaft, which occasioned loss of tonnage, and an additional expenditure of about £2,000. During April, however, a working profit of about £4,300 was made, which offsets the losses of the first three months and enables a working profit of £1.400 to be shown for the first four months of this year. To this sum can be added interest and other revenue which brings the net profit of the four months to £5.700.

Profitable Operations.

The forecast made by me at our last annual meeting to the effect that we should be able to continue profitable operations throughout 1920 (which was based on a price of gold equal to 25 per cent. above standard, or 105s. per fine ounce) has been borne out by results, and the fact that such large profits have been earned is due entirely to the price of gold during the latter portion of 1920, remaining about 35 per cent. above standard.

At the last few annual meetings I dealt fully with the prospects of the company, and most shareholders must be well acquainted with the views of the Board and the considerations underlying the policy followed of recent years. Full information upon these matters can be obtained by reference to the directors' annual reports and the reports of proceedings at the annual meetings of shareholders. I need not, therefore, go over the same ground again, but I propose now to deal briefly with the position as we find it at the present time.

To bring your information up to date I may say that the development accomplished in the area south of the dyke during the past three years, at selected points which gave most promise of encountering a fair percentage of payability, has raised the total tonnage ex posed in this area to 1,021,000, of which 166,800 tons, or only 16 per cent., have been classed as payable. Regarding the patch of payable main reef north of the dyke the total tonnage developed to the end of last year is 193,700, of an average value of 7.9 dwt. Of this quantity 117,400 tons of an average value of 8.7 dwt. have been mined, and 81,300 tons of an average value of 6.7 dwt. remained in reserve at the end of the year. Any further tonnage secured in this area will result from the advance of stope faces in unvalued ground, and as far as can be judged at present, will not exceed 11,500 tons. It is, therefore, evident that this recently discovered area will have yielded the company over 200,000 tons of comparatively high grade ore, and without it your company would probably have stopped mining operations some two years ago.

Southern Area.

Now, in regard to our very extensive undeveloped southern area, consisting of approximately 615 claims, we have previously discussed the feasibility of working this ground. Owing to the position of the Simmer dyke and the great vertical depth at which the reefs are situated, it is impracticable to develop this area except by means of a new vertical shaft from the surface. The depth of such a shaft would probably be about 5,000 feet, and with its equipment would cost quite £250,000. In addition a very large sum would also have to be provided for development from the bottom of the new vertical. The consulting engineer, in his report now before you, does not recommend this course, because he does not consider the prospects warrant it, and I feel sure you will approve of his recommendation.

Whilst on the subject of development of our southern area, I cannot help referring to the serious situation which would arise for the mines in our neighbourhood should the East Rand Proprietary Mines, Ltd., close down. In the absence of some arrangement for continuing the pumping of the large volume of water which that company's mine has to handle, it would only be a short while before this and other mines are flooded without any hope of their being able to deal with the water, owing to the great cost of pumping involved. The matter has recently been investigated by a committee appointed by the Department of Mines and Industries, and you have doubtless seen the majority and minority reports which were published yesterday.

I do not propose to refer to these reports in detail as the problem will not, under present circumstances affect us, owing to our short life; it might, however, affect the company very materially if we contemplated the development of our southern claims.

During last year the Board acquired an area of mining ground from the Knights Deep Company on our western boundary when that company closed down. So far to date we have mined 2,800 tons and under the agreement, a sum of 1s. per ton is paid for all ore trammed by us from the area. It is not anticipated that any material tonnage will be derived from this source.

Position Summed Up.

To conclude my remarks about our mine, I may sum up the position thus: Development work has to all intents and purposes ceased. Our remaining life is therefore definitely limited by the small tonnage of ore still in reserve, supplemented by such tonnage as reclamation work may yet yield, and it seems doubtful whether we can survive the current year. The opening up of our southern area is impracticable and unwarranted. It is probable, therefore, that before very long at our present rate of crushing, the available ore will be exhausted and operations will automatically cease. Various other important factors govern our imme diate future—such as the price of gold, working costs, freedom from accident or other adverse occurrence, and so forth; and I can only repeat what I have stated before, viz., that it is our intention to continue operations until it is demonstrated that we can no longer earn profits, when we will put before shareholders the question of liquidation.

I have been asked by a shareholder what sum this company is likely to have to contribute to the Miners' Phthisis Compensation Fund when it closes down. I have had an estimate prepared which I would like to give you. Assuming the company closed down at or before the end of this year, the sum in question is approximately £27,000.

Since we last met the Board has suffered the loss of one of its members owing to the death of the late Mr. W. P. Fisher. His advice and assistance have been of great service to his colleagues and his death is deeply regretted.

I wish to record the Board's appreciation of the services of Mr. E. H. Clifford, who has acted as our consulting engineer for the past three years. Mr. Clifford, who has recently retired from Johannesburg, has rendered good service to our company, and I am sure you will join with me in wishing him every success in his future. I would also like to refer to the excellent work done by our manager, Mr. T. McAlpine and his staff.

I now beg to move that the directors' report, balance sheet and accounts for the year ended December 31, 1920, laid before the meeting, be received and adopted.

Shareholders' Questions.

After the seconding had taken place, a shareholder desired to learn if it was possible for the southern area to be worked from any other shafts, and if one could not be driven into the ground from a neighbouring mine.

The chairman, in reply, stated that 18 months ago the Witwatersrand Mine had been approached to find out if they were willing to continue their drives into the Knight Central, but they were compelled to refuse owing to their air supply only being sufficient for their own requirements.

A letter received from a British shareholder asked why the mine was being worked when no profits were likely to result. The chairman pointed out that though a loss had been made during three months, the fourth month showed a profit, which they hoped would continue for some time. Replying to a suggestion, in the same letter, that the directors should invest the mine moneys for shareholders, he refused to entertain the idea, stating that this was a matter that shareholders preferred to have left in their own hands.

Following the declaration of another shareholder that it was the unanimous desire of shareholders that the company should be placed in liquidation and a portion of the cash now in hand distributed as dividends, this was embodied in a resolution and put to the meeting. On the vote being taken it was defeated, the majority holding that in the interests of the Government, the employes, and the country, the mine should carry on as long as it was possible to do so.

After the adoption of the reports and accounts, the retiring directors were re-elected and the meeting concluded.

VILLAGE DEEP.

At the annual general meeting of the Village Deep, Ltd., presided over by Mr. E. G. Izod, in the Corner House, May 25, the chairman said:

The report of the directors, with statement of accounts, together with the reports of the consulting engineer and manager, are already in your hands, and you have no doubt studied them with due care. During the year 1919 our company leased certain portion of its ground to the Village Main Reef, which that company worked until it finally ceased operations, and the lease has, therefore, now lapsed.

Operations for the year 1920 resulted in a total working profit of £128,581 being earned. With certain adjustments from working expenditure and revenue account this profit was converted to a net profit of £138,332.

Two dividends, totalling 10 per cent., were declared during the year 1920, which must be considered a fairly satisfactory distribution.

The ore reserves at the close of the year 1920 showed that the tonnage position had been maintained, with, however, a slight drop in the value of .2dwt. per ton.

The development actually accomplished for the year showed a slight decrease in tonnage, but an increase in grade from 6.0dwt. in 1919 to 6.3dwt. in the year under review.

The total working expenditure for the year showed an increase of over £92,000 as compared with the previous year, being an increase of approximately 2s. 9d. per ton milled. The heaviest items accounting for this increase were:—

	Increase.
White wages	£39,473
Coloured wages	8,628
Miners' Phthisis contribution...	7,196
Stores...	23,697

As it may be of interest to shareholders to compare certain salient points in the working of the mine at two different periods, I give below a short tabulation comparing the last six months of 1914 with the first six months of the year 1920:—

	Six mo's ending 30-6-14.	Six mo's ending 31-12-20.
Tons milled	291,700	291,300
Average number of white employes working—		
Surface	202	190
Underground ...	248	287
Totals	450	477
Average wages paid to white employes, including cost of living bonus, etc., for 26 days working—		
Surface	£25.2	£40.6
Underground ...	£27.3	£48.0
Average	£26.3	£45.0
Fathoms broken in stope faces by machines per 26 machine shifts, excluding reclamation	15.3	14.04

Wage Increase and Work Decrease

From the above figures it will be seen that there has been not only a steady increase in our expenditure on white wages, but it has been accompanied by a decrease in efficiency.

I am glad to say that expenditure on mine development and equipment charged to capital account showed a marked reduction when compared with the previous year's working, the total expenditure for 1920 being £9,911, which, after crediting certain sales of plant, brought the net capital expenditure down to £2,663, as compared with the net capital expenditure on development and equipment for the previous year of £29,046.

Dealing now very briefly with accounts for the year 1920, it will be seen that the total amount charged to appropriation account is £133,369, made up of:—

Total capital expenditure, including annuities in respect of undermining rights, etc. . .	£12,099
Taxation	15,203
Dividends Nos 22 and 23 .	106,067

The balance of the appropriation account brought forward at the end of the year 1919 was £151,229, to which has been added £138,332, representing the balance of working expenditure and revenue account It will be seen, therefore, that a total sum of £289,782 was the figure from which had to be deducted the amount of £133,369, which was charged to appropriation account during 1920, leaving a balance unappropriated carried to the balance sheet of £156,413, of which £59,419 represented net cash after allowing for all liabilities.

This represents a fairly satisfactory result, and shows that our financial position at the end of 1920 was approximately the same as at the end of the year 1919.

I do not propose to refer further to the operations for the past year as they are so fully dealt with in the reports and accounts. What is probably of more interest to shareholders is the present position and prospects of the mine, and this I will endeavour to deal with.

The yield for the first four months of the current year at 6.16dwt. per ton is a shade lower than the average for 1920, while the working costs for the same period at 29s. 5d. per ton milled show a slight saving of approximately 5d. over the average for 1920. It must, however, be realised that the average for the first four months of the current year was somewhat upset owing to the abnormal conditions which prevailed in February, when a strike of white miners took place, and seriously hampered operations for six days.

Done During the Strike.

During the strike a systematic clean up of the mine was taken in hand, with the result that over 43,000 tons of ore were sent to the mill, in spite of the fact that no rock was broken during that period. Costs for the month of February were consequently considerably reduced owing to the reduction in expenditure on white wages, explosives, etc., the net result being a profit of nearly £9,000 for that month. I think I am expressing the feelings of the shareholders in saying that the ability to carry on in spite of the temporary strike reflects great credit on the manager and his staff

A study of the development since the beginning of the current year shows that a total of 2,731 feet of driving has been done on the 26th and 30th levels inclusive, and cross-cutting has been commenced oft the main incline shaft at the 31st and 32nd levels.

Boxhole raising from drives situated under the footwall of the reef has been carried out to the extent of 1,600 feet, and these boxholes should reach the main reef leader more or less simultaneously. Winzing has amounted to 1,103 feet, which 938 feet were sampled, and 823 feet, or 83.3 per cent. were returned as payable, the average disclosures of the payable footage being 347 inch-dwts.

The development of the lowest portion of the mine continues to be satisfactory, the exposures in the winze below the 29th level averaging 422 inch dwts. over a distance of 125ft.

To summarise the position for shareholders, it might be said that in the area explored on the west side of the incline shaft the development is satisfactory, but that the area on the east side has not shown quite such good results, although it must be remembered that this latter area is very much disturbed by faults and dykes, making proper estimation of the value rather difficult without more detailed development work being accomplished.

The main incline shaft has been sunk during the current year a further 142ft., and has now reached the horizon of the 32nd level; the shaft bottom being 6,067 ft. vertically below the collar of the Turf vertical shaft.

More Natives Required.

The native labour supply is still much below the requirements of the mine. The average percentage of our underground complement was only 73.32. A mine like ours, with a small margin of profit, benefits considerably from having a full supply of natives. Just at the present time we cannot complain of being placed in a worse position than any other mine so far as the percentage of complement is concerned, yet our capacity to earn good profits depends very largely on milling a maximum tonnage, and to enable this tonnage to be mined necessitates a full complement of underground natives.

We are gradually replacing reciprocating machines in the mine by jack hammers, and hope by reducing the stoping width to increase our grade and efficiency. What is, however, of equal importance is that with the smaller holes drilled by jack hammers we are able to use a lighter charge of explosives, and the hanging wall should not, therefore, be so badly shaken as would be the case if we continued with the large 2¾ machines. It is very necessary to take precautions such as this when mining great depths, and the results from the more extended use of jack hammers should be safer and cleaner mining.

In my last speech to shareholders I stated that when hoisting had to be carried out below 32nd level it would be necessary to instal double stage winding on the incline by erecting subsidiary hoists at probably the 31st level. Careful attention has been given to this matter by our technical advisers, and it is now proposed to sink two moderate size inclines from the 32nd level instead of continuing one large incline as has been the policy up to the present time. The principal reason for this is that the rock pressure at the bottom of the mine is so great that the support of a wide shaft is a difficult and very expensive matter. The smaller shafts should be less costly in maintenance. When working at the great depths which we have to do on this mine, crush is an expensive trouble which we always have to live with: and every step taken to reduce the effects of this crush is so much greater saving in the working costs.

The fact that two small three compartment inclines will enable us to open up the lower ground more rapidly constitutes an additional reason for adopting this policy.

The final details of the scheme are not yet completely setled, but we propose to start the necessary work of preparing to sink the inclines almost immediately, in order to have sufficient tonnage available for stoping before the reserves above the 30th level become exhausted.

Present Year's Prospects.

Capital expenditure for the current year should not be a heavy item. Last year I stated that I did not foresee any great capital expenditure beyond that for the equipping of the hoists for the subsidiary inclines, and for installing the central pumping scheme. The expenditure on the former will really be a charge against working costs, and will not in any case be incurred during the current year. The expenditure on the latter item, namely, central pumping scheme, or our proportionate contribution to the scheme, should be approximately £11,000 during the current year. This item, added to other minor items of capital expenditure, will bring our expenditure under this heading for the current year to about £14,000, and this amount should not be exceeded unless we have to face some expenditure which at the moment we cannot foresee

In the above remarks I have endeavoured to give a fair general picture of the work to be carried out for the current year, but I find it a good deal more difficult to attempt to forecast the future of the company. We have a good mine, although a very difficult one to work, but in spite of all the troubles connected with deep mining, we have, by the exercise of good management, and with able technical advice, been able to carry on quite satisfactorily. As I stated in my last address to shareholders, the maintenance of a fair increase above the normal price of gold is of vital importance to our company. The price of gold has recently declined, and if it falls to approximately 95s. or below this figure, and we are not able to make a reduction in our working expenditure, I am afraid we shall then no longer be a profit-making mine, and may have to seriously consider the cessation of operations. May I recall to shareholders the remarks of Sir Lionel Phillips in his speech at the last annual meeting of the Transvaal Chamber of Mines. Sir Lionel stated that the mining industry was afflicted with creeping paralysis, and as far as I am aware this is an incurable disease. I am, however, a very strong believer that in the particular form of disease which is attributed to the mining industry there is, in many cases, a cure available, or if not an absolute cure, that a substantial relief can be found.

Mining World's Position.

Let us look at the position of mining and other industries all over the world. We find we are not the only large organisation or industry which has to put its house in order. Looking at the position quite frankly and fairly, and it has been stated by many other chairmen besides myself, it is undoubtedly a fact that the industrial world is suffering from a policy created very largely since the great war, namely, the policy adopted by many workers in all walks of life of "less work and more pay." The relief which I am absolutely convinced can be obtained by every industry, including our own gold mining industry, is a complete reversal of this policy, and if all those who earn their living on the mines would realise that more work and less pay is far preferable to no work and no pay, then I, for one, am satisfied that many of our mines would not have such a dark future to face.

The times ahead of us may call for the exercise of grim determination and self-sacrifice, but I firmly believe that we can and shall make such supreme efforts that the great gold mining industry, which means so much to us on the Rand, will continue to be a flourishing and prosperous one.

In conclusion, I should like to express our thanks to Mr. H. Stuart Martin, our consulting engineer, and to Mr. Whitehouse, the manager at the mine, and his staff for the very able way in which they have directed the work of our company during the past year.

The adoption of the report was duly seconded and unanimously carried.

GELDENHUIS DEEP.

In his address to the shareholders of the Geldenhuis Deep, Ltd., at the annual general meeting held on May 25 in the Board Room of the Corner House, Mr. Max Honnet, who presided, said:

Thanks to the fact that we were able again to sell gold at a figure considerably in excess of standard price, we emerged from the year 1920 with a fairly satisfactory profit, in spite of the higher working costs which prevailed throughout. The working results show that it cost £777,054 to recover 156,194 ounces of fine gold, or 99.5s. per fine ounce. The gold realised £861,945, or 110.4s. per fine ounce, leaving a profit of £84,891, or 10.9s. per fine ounce. The yield has remained at the same figure, namely, 5.6dwt., for the last three years. The tonnage milled at 557,500 tons was practically the same as that of the previous year, and while working costs were 3s. 11d. per ton higher as compared with those of 1919, the revenue per ton at the increased price of gold, fortunately for us, was 5s. per ton higher.

The figures I have quoted show how vitally dependent we are upon the maintenance of the price of gold at a level considerably above standard (84s. per fine ounce), and this fact is confirmed with unpleasant emphasis when we consider the results obtained since the close of the last financial year. For the first four months of the year 1921, although our gold production has been taken in at an average of 103s. 6d. net per fine ounce, operating costs have averaged 108s. 10d. per fine ounce, and for the four months in question a loss of £13,145 is shown, that is an average monthly loss of £3,286. Generally speaking, since no improvement in grade can be looked for, the results for the current year show very clearly that in the absence of a higher price for gold there is only one other direction in which we can look for a means of preventing working losses, and that is in the reduction of working expenditure.

Gold Standard Falling.

So far as the price of gold is concerned, it is generally agreed, I believe, that the inevitable trend is in the direction of a decline towards standard value. To keep this company's mine going we are therefore driven to the alternative of reducing working costs and concurrently improving efficiency. Working costs per ton milled, which in 1914 were 22s. 10d., had risen to 27s. 10½d. for the year under review, and for the four months of the current financial year they have risen still higher to an average of 29s. 8d. With costs at this level, a gold price of even 103s., as has been shown, is insufficient to meet the expenditure, and it is therefore apparent that unless a considerable reduction in costs can be brought about, working losses will continue, leading inevitably to the closing down of the mine.

Last year you were informed that the position was precarious, and that with the co-operation of the white men on the property, a limited amount of retrenchment and reorganisation had taken place, and that further efforts were being made to improve matters. Almost immediately after the last annual meeting the price of gold began to rise sharply. This advance afforded most welcome and timely relief, enabling fair profits to be earned instead of losses, which were made during the first half of the year.

To enable you to appreciate the significance of the higher working costs, I give below in tabular form the main headings under which our costs are incurred, from which you will see at a glance how the burden has increased since last year. The tonnage milled, you will remember, was practically the same in both years:

	1919	1920	Increase. Total.	Increase. Per ton milled
	£	£	£	s. d.
White wages .	205,981	248,013	42,032	1 7
Coloured wages .	123,978	138,858	14,880	0 7
Stores and material	198,151	231,178	33,027	1 2
All other costs . .	143,324	159,005	15,681	0 7
Total	£671,434	777,054	105,620	3 11

The additional expenditure for the year is shown to be no less than £105,600, equal to 3s. 11d. per ton milled. As will be seen, the principal increases arise under the heads of white wages and stores and materials. Coloured wages are not capable of much reduction. The main increases for the past year under the head of "other costs" are phthisis contributions (white and coloured) £8,000; native labour importation fees, £4,650; holiday and sick leave pay, £2,880; insurances, £1,200.

Two Important Factors.

The two items which afford the greatest scope for reduction therefore are the two which show the heaviest increases, viz., white wages, and stores and materials.

In regard to the latter, in view of the fact that the prices of stores and materials are beginning to fall, I think we may expect to effect appreciable savings in the future. There remains the question of white wages. Something must be done in this direction. I can assure you the management are doing everything possible to avoid losses; for instance it has been decided to curtail development work again, and in this way we hope to save £800 to £1,000 per month. Great efforts are being made to improve the underground efficiency and it is hoped to increase the working time of our underground native labour force. These efforts, we believe, will not be without effect, and we hope to get some practical assistance from our employes, without which our endeavours will be unavailing.

Some trouble was experienced during the year on account of caving ground in the eastern section which has now put the old No. 1 shaft out of commission. The No. 2 shaft of the same section may be similarly affected sooner or later, but it is hoped that this shaft will outlast the quantity of ore in reserve which remains to be extracted. The comparatively small amount of development done in the western section continues to expose satisfactory values, though no very great quantity of ore has been rendered available. Reference is made in the reports to exchanges of ground with Jupiter Gold Mining Co., Ltd., and the Simmer and Jack Proprietary Mines, Ltd. These transactions involve no large areas, but will be of assistance to us in working the deepest portion of our mine in the estern section.

Increased Development.

During the year under review the development footage, which for 1919 amounted to only 4,735ft., was increased somewhat to 6,317ft. We are able to undertake a little more development owing to the better profits earned during the latter half of the year. Of the 6,317ft. acomplished, about 28 per cent. proved to be payable and developed 150,600 tons of payable ore. On re-estimation, the ore reserve at December 31 amounted to 1,467,100 tons, of a value of 6.1dwt., showing an increase for the year of 91,900 in quantity and .2dwt. in value.

In addition to our existing ore reserve, the mine contains a large tonnage of reef, fully developed, which is classed as unpayable. The development of this ore has been paid for and the great bulk is available for mining, but owing to the present high working costs we are obliged to leave it out of our calculation of payable ore reserve. Eliminating ore below a value of 4dwt., we find that there is a developed tonnage of no less than 1,218,000 tons, valued at 4dwt. and over, but below the present-day pay limit.

An Anomalous Position.

We are therefore confronted with the position that the mine, which has a payable reserve of practically one and a half million tons of ore, valued at 6.1dwt., a grade which even to-day should allow a reasonable margin of profit, is making losses owing to excessive working costs. This quantity of ore is sufficient to provide employment for our white and coloured workers for at least two years, provided costs can be reduced.

In addition to the above reserve, as I have said, we have standing developed in the mine practically 1¼ million tons of ore, which, under normal conditions, it should be possible to work without loss. And yet this company, the pioneer of the Witwatersrand deep level mines, which has spent for many years past something like £700,000 annually in this country, and which employs to-day over 500 white people and over 4,000 natives, stands in imminent danger of being compelled to close down owing to the prevailing high level of working costs.

A very important point to be observed in connection with the large tonnage of low grade ore referred to is that the time for working it is now, while the mine is still running and while the low grade ore can be treated in conjunction with the remaining tonnages of higher grade.

It is useless to contemplate the extraction of this ore at some date in the distant future, for if once the mine is closed down, or such tonnage rendered unavailable by caving, the expense involved in reopening the workings will be too great to undertake, in view of the low value of the ore, and the opportunity will be lost, possibly for ever.

Our immediate problem, of course, is to make our payable ore reserve of 1,467,100 tons of 6.1dwt. yield profits. I am convinced that this can be done, without any very great sacrifice, and I am optimistic enough to believe that it will be done before long.

In conclusion, I wish to record our appreciation of the valuable services rendered to the company for a number of years by the late consulting engineer, Mr. E. H. Clifford, who resigned upon leaving this country, and by Mr. Edgar Pam, the late manager, who left us a few months ago to take up the management of another mine.

A word of appreciation is due also to the mine officials and employes for good work done during the past year. The board has appointed Mr. H. W. Adler as manager of the mine, vice Mr. Pam, and Mr. A. J. Brett performs the duties of consulting engineer on behalf of the Central Mining and Investment Corporation, Ltd., in succession to Mr. Clifford.

I new beg to move that the directors' report, balance sheet and accounts for the year ended December 31, 1920, laid before the meeting, be received and adopted.

The adoption of the report, having been seconded in due course, was unanimously agreed to.

The South African
Mining & Engineering Journal
THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.
Established 1891.

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A VIEW AT THE CROWN MINES.

Crown Mines: View of South Rand Shaft and Crusher House. A full report of the speech of the Chairman, Mr. Samuel Evans, reviewing the year's results, appears in this issue.

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P O Box 239 Cape Town. Telephone : 1202 Central.

G. H. B. BERNARD, A.M.I.E.E.
9-10, Cotts Buildings, Rissik and Fox Sts.,
JOHANNESBURG.
P.O. Box 7404 Johannesburg. Telephone 408 Central.

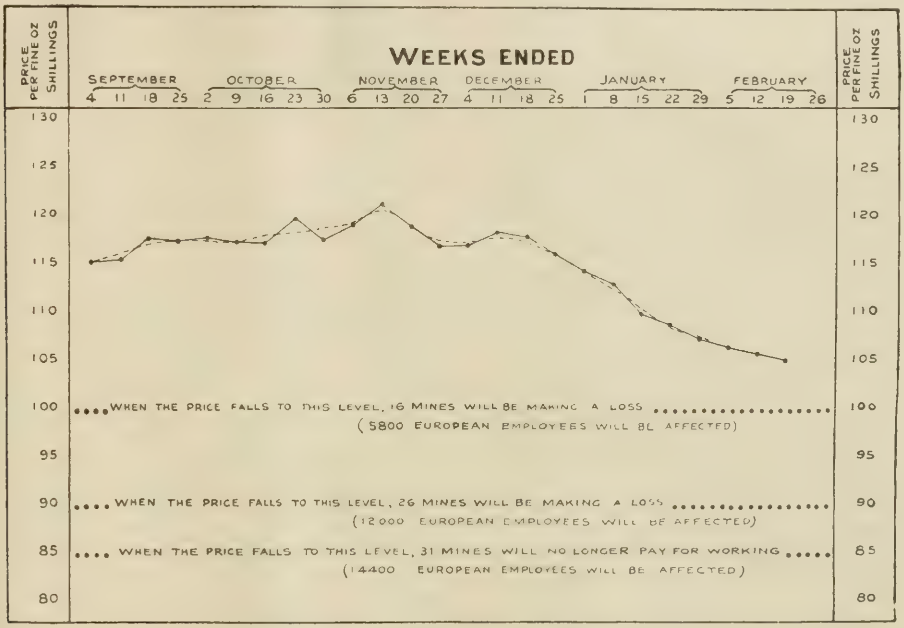
Telegrams: "SIEMENS."

The Fluctuations in the Gold Premium.

WHAT OF THE IMMEDIATE FUTURE?—LAST YEAR'S CHANGES—A BETTER TENDENCY—A GOLD "FAMINE" AND THE WORKING OF LOW-GRADE DEPOSITS.

Gold on Monday last touched 106s. 1d. per oz., and the tendency seems to be improving, though to nothing like the extent spoken of by an immaginative scribe in the Sunday paper last week. In view of the discussion now in progress in regard to wages, it is, of course, more necessary than ever to try to get the true figures regarding the premium. The parlous plight of British industry, due to the prolonged coal strike, is obviously the chief cause in the drop in the American exchange, and consequent rise in gold premium. Moreover, it is usual —if what has only been observed for a year can be so described—for the premium to rise in the autumn with the rise of the American dollar. This, in turn, is caused by the movement of the American harvest, or rather, the necessity of paying for it. But with the changes in the premium, we, on this side, have, of course, to take into consideration the realisation charges which, we all know, varied considerably last year, when at one time they were as high as 8s. 9d. per ounce. The following table gives the figures of the prices realised last year, and may prove of value in helping to read the immediate future of the premium during the current year. Per fine ounce the values were:—

1920.	Estimated Value. s. d.	Realisation Charges s. d.	Estimated Net Value s. d.
January..	107 6	1 0	106 6
February...	110 0	5 0	105 0
March...	105 0	6 3	98 9
April...	102 6	7 6	95 0
May ...	105 0	8 9	96 3
June ...	102 6	7 0	95 6
July ...	105 0	1 6	103 6
August ...	112 6	0 6	112 0
September	115 0	0 6	114 6
October ...	117 6	0 6	117 0
November ...	117 6	Cr. 2 0	119 6
December ...	115 0	Cr. 4 0	119 0



Gold Premium: Six Months' Fluctuations.

Put in another way the Chamber of Mines official returns show the monthly prices to be: Price per oz., 1920: January, £5.375; February, £5.5; March, £5.25; April, £5.125; May, £5.25; June, £5.125; July, £5.25; August, £5.625; September, £5.75; October, £5.875; November, £5.875; December, £5.75. 1921: January, £5.25; February, £5.1875; March, £5.1875; April, ———

In a footnote attached to one of the latest quarterly reports received by us, i.e., that of the Wolhuter, the following appears: The amount of working revenue, viz., £114,904, has been arrived at after allowing for the following estimated prices per fine ounce: February, £5 3s. 6d. per fine oz., after deducting realisation charges; March, £5 3s. 3d. per oz., after deducting realisation charges; April, £5 3s. 3d. per fine oz., after deducting realisation charges. The lower profit was due principally to the heavy decline in the price realised for gold during the quarter, and partly to the decrease in the tonnage milled, which was due chiefly to the miners' strike which took place in February.

These figures for the Wolhuter may be taken as typical of the Corner House mines' results in the quarter; and the following footnote to the Barnato quarterly reports for the three months ended March 31, agrees with the results from those of the Corner House: The declared profits have been arrived at by adding together the published monthly figures. The value of the gold was taken as follows: January, £5 5s.; February, £5 3s. 9d.; and March, £5 3s. 9d.; which averages 12s. 6d. per fine ounce less than the previous quarter. The decrease in the price of gold largely accounts for the decreased profits for the quarter, but the operations of most of the companies were adversely affected during the month of February by the strike of miners.

What the reduction means in round figures may be gathered from the following passage in the Robinson Deep report for the quarter ended March 31: "The value of gold per fine ounce, less cost of realisation, during the quarter was taken at 104s 6d. for January, and at 103s

3d. for February and March. This reduced value, compared with that for the previous quarter, has affected the Company's revenue from gold for the quarter by some £28,000."

It may be repeated that the price on Jan. 2, 1920, was 109s.; that is to say, at a premium of about 28.5 per cent. on the Bank of England buying price, 77s. 9d. per standard (84s. 9.81d. per fine ounce). The price on Dec. 31, 1920, was 116s. 1d. (36.8 per cent. premium). The lowest price, 102s. 7d. (20.9 per cent. for 1920), was touched on April 9; the highest, 127s. 4d. (50.1 per cent. premium) on February 5. The average was 112s. 11.52d. (33.2 per cent. premium). Since the end of last year there has been a marked decline in the price, though, as we have already pointed out, the tendency is, for the moment, better. The fact is, as shown by some authoritive returns of the world's gold output, presented elsewhere in this issue, that the supply is seriously declining. A writer in these columns, as far back as February last, anticipated Mr. Samuel Evans's reference to the matter at the Crown Mines meeting, by stating: "The world has need of more gold. The yellow harvest is rapidly absorbed and the supply is failing. And arising out of this famine immense low-grade ventures, the discards of the gold mining industry, will assume tremendous measures of importance. By reason of the rise in the product three dwt. ore will be an attractive proposition. It looks as if it would be policy for governments, for mining corporations and the captains of industry to make provision for such an eventuality. It seems a reasonable suggestion to advocate that where gold mines are closed down not on account of exhaustion of ore content, but because of present unfavourable conditions, that in such cases provision should be made by the mining companies concerned or by Government or by a combination of both parties to maintain these properties in a state which will admit of them being reopened. For the day is assuredly coming when 3 or 4 dwt. ore, even when lying at considerable depths, will be profitable to work.

A Big Mining Engineer's View.

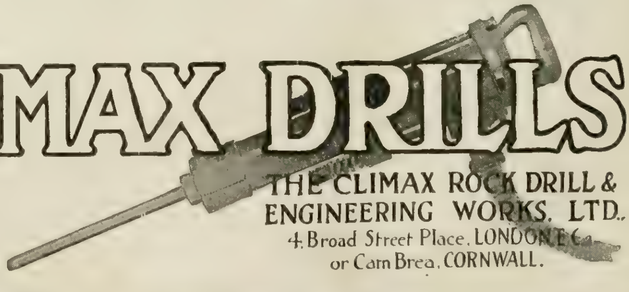
"This coming shortage of gold was foreseen some time ago by several long-headed business men associated with mining. The writer well remembers a conversation he had a year before the outbreak of the World War with one of the greatest mining engineers of the day. This gentleman was representing influential European interests, and he stated that there were large sums of capital available for any new and promising gold fields. He stated that no new auriferous deposits of importance were coming to the fore, and that the production of the world's output was waning."

When Mr. Samuel Evans talked last week of the possibility of treating 3 dwt. Main Reef at a profit he was, with his usual prescience looking into the future. Of course the whole question resolves itself into one of cost of production, plus price obtainable for the product. With its admittedly large low grade ore deposits the Rand manifestly stands to benefit enormously from any scheme that would make their working profitable. Every increase in the gold premium, and every reduction in working costs, however small, all tend in that eminently desirable direction, and are therefore of the most vital and direct interest to all who have the future of the country and the industry at heart.

INSTITUTION OF MINING AND METALLURGY.

The 30th annual general meeting of the Institution of Mining and Metallurgy was held in London recently, Mr. F. W. Harbord, the new President, in the chair. In the annual report the Council remark that the Institution has emerged from the heavy strain upon its resources and activities imposed by the War period stronger and more firmly established than before, a result which has been achieved by the continuous efforts of its Council and Officers and the loyalty and co-operation of members in all parts of the world. The Council look forward with renewed confidence to further substantial progress in the near future. After pointing out that the mineral industries throughout the world, and especially within the Empire, have been passing through an unprecedented period of stress from which they have not yet emerged, the Council express the opinion that the increasingly complex technical problems of the mineral industry can only be solved by sustained effort to keep abreast of scientific and engineering progress. The still more complex human difficulties demand enlightened and persistent individual and collective endeavour to develop a spirit of co-operation amongst all grades engaged in the industry, and the adaptation of existing methods to the new conditions brought about by the world events of the past few years.

The Council then proceed to deal with the steps taken to secure closer co-operation with the Institution of Mining Engineers, which part of their report was dealt with in our issue of last week. They then proceed to trace the record of their controversy with the Institution of Civil Engineers regarding the Bill promoted by the latter body for the registration of Civil Engineers. They print in extenso the letter of protest addressed by their Secretary (Mr. C. McDermid) to Dr. J. H. T. Tudsbury (Secretary of the Institution of Civil Engineers), setting forth the objections to the Bill, and recall the fact that a deputation from the Institution met a Committee of the Council of the latter body to emphasise these objections. A copy of the further letter addressed to Dr. Tudsbury embodying a resolution unanimously passed by a meeting of nine leading engineering and metallurgical societies requesting the Institution of Civil Engineers not to proceed with the Bill is included in the report, followed by a reference to the communication subsequently received intimating that the Council of the Institution of Civil Engineers had decided not to proceed with the Bill, but had decided to apply for a supplemental Royal Charter to authorise the use of the professional description "Chartered Civil Engineer" by corporate members of the Institution of Civil Engineers. In the meantime the important question of the registration of engineers continues to receive the close attention of the Council.



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The Coal By-Product Industry in South Africa.

Ask anyone who uses oil, any owner of motor, machine, engine, or even windmill what oil he uses and trace back its origin. In almost every case it will be found to be from natural oil wells and from these wells in America. Readers need not be told that the parent of this huge business is the Standard Oil Co. of New York, who through their subsidiary companies control lubrication in this country, and also to a great extent the burning oils and petrol.

Standard Oil vs. Scottish Oil Shale.

It has not been always thus, although for the past twenty-five or thirty years the American product has silently forced itself into every country and crushed out of existence nearly every competitor. "Nearly" is said advisedly, for let it be remembered with pride that at the hey day of their power, when they could sell their paraffin oil in Britain at 4d. per gallon, the Scotch oil shale companies, like Belgium on a more recent historic occasion, with their back to the wall, said: "No; we'll fight." And fight they did. For years in Scotland burning oil was sold at 4d. to 4½d. per gallon, and naphtha at 3d. to 3½d. In these days of petrol at almost 6s. per gallon, what would motorists give for this fuel at that price! The Scotch companies never claimed to pay dividends on burning oil at 4½d. per gallon, and they could always count on getting rid of a large part of their product at an enhanced price to the Lighthouse Commissioners. The Lighthouse Commissioners did not do this from philanthrophy. The British have a nasty way of forgetting home industries and allowing the foreigner to come in and strangle the new born, but in the case of burning oil the quality was so much superior to the American that for coast lighthouse work, where a pure light and safety was above all things necessary, the home product for once outshone the foreign. Then there was the ammonia for fertilisers when the American "squeeze" got specially heavy they turned to seams of shale specially high in nitrogen. The Pumpherston shales and some others contain nitrogen, which in the form of sulphate of ammonia equalled a value of almost 10s. per ton of shale. And so the struggle continued with varying fortunes through a quarter of a century. But even with a superabundance of cheap oils just across the herring pond, the Americans at the zenith of their production were never able to oust the shale products. Hard times made them take heed and improve their methods and cut their costs to the lowest.

A Scotch colliery is a synonym for economic work, but a Scotch shale oil works beats it, if that were possible. American oils, burning and lubricating, have been so long in the market that the present generation only know of lubricants bearing American brands. There was, however, a huge mechanical world—even if there were no motor-cars—long before an American well was discovered. The first refineries in America were built on Scotch lines to refine oils recovered from Canadian shale.

Early Oil Supplies.

In these far back days supplies of oil were drawn from three sources, vegetable oils, colza, etc., animal oils, seal, whale, etc., and the mineral oils recovered from refining the gas works tar, and, from 1840 onwards from the distillation of oils from shales and coals. For the past twenty years the output of lubricants from coal by-products has been going up by leaps and bounds. Works innumerable have sprung up all over the old country; some are attached to collieries and refine their own products. Others are entirely dependent on the purchase of crude materials. Some only do part refining, like the blast furnace works, which generally only produce sulphate and pitch in the finished form and sell their oils as heavy and light in the crude form. The trade in these by-product oils is to-day enormous. In this country thousands of tons of material as high in these oil and pitch contents as the best in Britain are *daily* sent to the colliery bins to be burned into ash, and with the exception of a small plant at Witbank Colliery, not the slightest attempt is made to recover them or to store up in safety this valuable material.

Tar Recovery.

By using ordinary retorts the recovery of tar from this waste coal runs from 12 to 20 gallons per ton. In one case a colliery near here sends material to the dump which has been tested and found to contain 21 gallons of tar per short ton.

Ordinary coal tar is to-day worth 3s. to 4s. per gallon if called imported, and the Witbank Colliery advertise theirs for sale at 2s. per gallon.

Tar is a complex material and is capable at slight expense of being divided up into a large number of very expensive articles. But at a cost of 6d. per gallon it can be split up into benzol burning oil, a whole list of lubricating oils, some paraffin wax for candle-making, and pitch. All these items except pitch have a local value of 5s. per gallon and over, and the pitch is still worth as much per gallon or cwts. as the original tar. To utilise the rejected coal it is necessary to instal retorts, and those giving the best results are what are known as low temperature distillation retorts. The oil shale retorts are of this class and have been improved till perhaps they are the best practical apparatus in the world for this purpose to-day.

Retorts.

These retorts with the condensing apparatus will cost in this country round about £2,000 each, and treat five tons of coal in the 24 hours. The labour bill is small, as one man per shift can attend to 10 retorts. The cost of retorting and producing the crude oil is given as 3s. 6d. per ton of shale, but for demonstration it can be increased to 5s. for this country costs.

These give some figures to work on for data. First, assuming that an average coal in Witbank, Breyton or Ermelo will only give 12 gallons of tar per ton, which is just about *half* of what one colliery is known to give, and also giving the colliery credit for 2s. 6d. per ton for stuff it at present pays boys to dump: Output and cost per each retort costing £2,000; interest on capital at 10 per cent. per annum, £200; depreciation at 10 per cent., £200; coal used for one retort per year, 1,825 tons at 2s. 6d., £228 5s.; cost of retorting at 5s. per ton, £456 10s.; total, £1,084 15s. At 12 gallons per ton each retort will produce in one year 19,800 gallons of tar, which at Witbank Colliery advertised price is value for £1,950, a clear saving of half the plant cost per year. Every two years the by-product plant would pay for itself without going into any expense for refining the

MINES DEPT. EXAMS., 1920.
CERTIFICATES AWARDED INSTITUTE.

SURVEYOR'S CERTIFICATES — March, July and October (Extra) Exams. 100 %, 50 % and 66 % respectively of S.A. total

MANAGER'S CERTIFICATES. — Two last Exams. (Sept., Jan.) 17 out of total 28 in S.A

OVERSEER'S CERTIFICATES.—Two thirds of the S.A. total for year 1920. 75 % for January, February, March, 1921.

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products. If the refining were taken in hand, and conducted at the same cost as at home, say, 6d. per gallon, then the average net price of the products would be increased by 50 per cent. and the total profits sufficient to *pay for the by-product plant every year.*

By-Product Markets.

Every one of these by-products has a ready market, and large quantities of every one of them are imported every year. Pitch is necessary for roadmaking. It can be stated as a dictum that roads in the Union to stand heavy traffic and be impervious to our torrential rains cannot be made without the use of tar or pitch. Fifty per cent. of the tar, approximately, on distillation, remains as pitch, and the other 50 per cent. is oils and benzols.

Of these oils the Standard Oil Company import every year over one million cases, of a value of £2,500,000. *All of which can be produced in this country.*

Our present consumption of these products is sufficient to keep more than 1,000 retorts in full commission, and would usefully employ a capital of over £3,000,000, on all of which a return of from 50 per cent. to 100 per cent. per annum would be earned. These retorts would consume 5,000 tons daily of discarded coal, which at present has no value and is being wasted. The foregoing takes no account of the value from surplus gas not required in the by-product works which can be utilised for power purposes for other work, and it ignores the production of sulphates of ammonia, a salt which was the salvation of the Scotch oil shale industry. The making of this valuable fertiliser has recently been tried in Natal from an anthracite, but with indifferent results. An analysis of their troubles proves that their failure was as much due to the cost of acid as anything else. In other words, in starting they put the cart before the horse.

Cheap Sulphuric Acid.

Cheap acid enters very largely in an almost unlimited degree into many articles of commerce and industrial use, and it is one of the phases of industry this country has to tackle before we attain any degree of success in the world's industrial markets. The secretary of Brunner Mond made the statement to Major Trevor, of the Mines Department, in company with the writer, that there was no sulphur or pyrite in South Africa. What a statement! It is true that none or very little has been produced to date. It is also true that in ever so many cases when prospectors saw pyrite they turned away from it, as pyrite so often meant loss of prospect to them in their search for gold. To say that there is none is just as true as it was fifty years ago to say there was no gold on the Witwatersrand. There was none till it was looked for and found. The key industry to many an industry, including sulphate of ammonia production from by-products, is cheap pyrite and cheap sulphuric acid. It can be got if only the necessary impetus is given, but to-day Sir W. Hoy, as he has done in the coal trade, bars the door to progress with his prohibitive rates for transport of acid, but this is away from the subject. Railway rates are not by-products, though they can make or unmake a success of any scheme for their use. James Young was the father of the oil shale industry, and may also claim to be the father of the great American oil industry, as his retorts and apparatus were first used there.

Who is going to be the South African "Young" and lead the way?

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MANAGER'S CERTIFICATE (COAL).—New Class recently started. Candidates being enrolled.

MINE SURVEYORS' CERTIFICATES.—We have secured **55** Certificates to date, and lead with passes by more than **10 to 1.**

OVERSEER'S CERTIFICATE.—We lead with passes, 1918 and 1919. **21** Certificates secured during 1920. Overseers' Class (Coal) recently started.

PRELIMINARY SURVEY.—We have trained the majority of the Assistant Surveyors working in the Mines.

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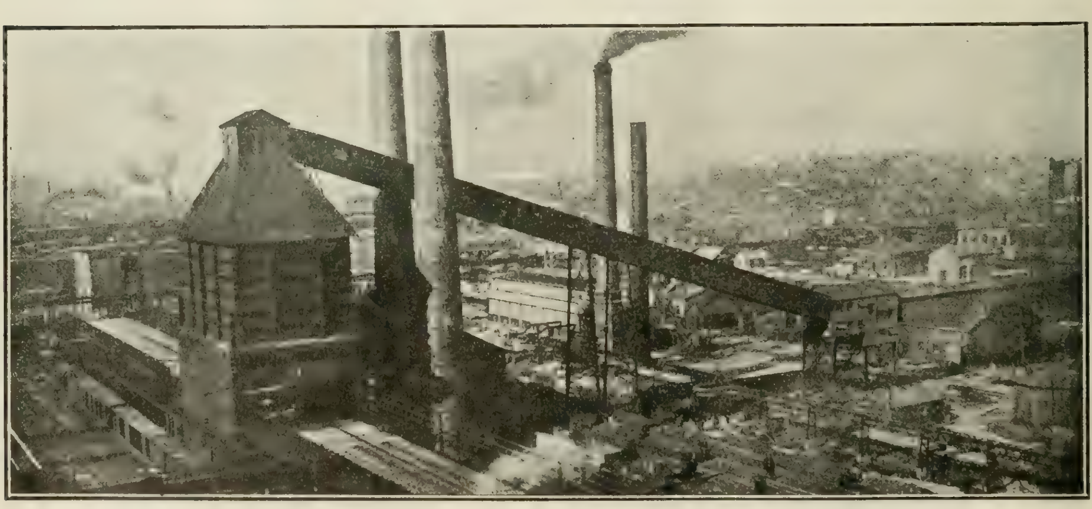

What the plant of the Dominion Iron and Steel Company, of Canada, looks like! Coke ovens, blast furnaces, and in the distance, shipping piers testify to the growth of a great industry and its many ramifications.

The Geology of Heidelberg District.

DIRECTOR OF THE GEOLOGICAL SURVEY MAPS AND DESCRIBES THE DISTRICT.

The following is an abstract of a paper entitled "The Geology of the Neighbourhood of Heidelberg," which was read by Dr. A. W. Rogers, Director of the Geological Survey of the Union, at the monthly meeting of the Geological Society of South Africa held last Monday night. It shows that as a result of the detailed mapping of Heidelberg some of the arguments against the mistaken correlation are greatly strengthened; but he says there is little doubt that some of the Kimberley reefs will be payable in the future.

The paper by A. W. Rogers, Director of the Geological Survey, on the geology of the neighbourhood of Heidelberg, describes the country between the Zuikerbosch Rand and the neighbourhood of Balfour. A coloured map (scale 1: 34,850) was shown on which the distribution of the rocks and the structure of the area have been laid down, and sections across the area were exhibited. The most important result obtained in the demonstration that each major sub-division of the Witwatersrand system diminishes in thickness southwards from the Rand, and that, in the country of which a geological survey has been made between the Klipriversberg and the Malan's Kraal, Tweefontein escarpment, there is no unconformity at the base of the Ventersdorp formation. The figures obtained for each major subdivision in Heidelberg are compared with the estimates made by Dr. Nellor on the Central Rand, and are as follows:—

	Central Rand. Feet.	Heidelberg. Feet.
Kimberley-Elsburg series	6,120	3,560
Kimberley slates	500	370
Main-Bird series	3,160	1,020
Jeppestown series	3,700	3,000
Government Reef series	6,220	4,090
Hospital Hill series	4,900	3,180
	24,600	14,220

The Witwatersrand beds in Heidelberg are shown to be affected by many faults, and the relations between the faults and the many intrusions of ingenous rocks are discussed in some detail. The most conspicuous dislocation, called the Sugarbush Fault, is later than most, if not all, of the minor faults, and later than most of the intrusions; it is an east and west fault which cuts off the Witwatersrand beds near Heidelberg from those near Balfour, and its throw diminishes westwards from at least 14,000 feet near Eden Kop to some 3,000 feet on Goedeverwachting, where it passes under the Karroo beds, which also conceal it beyond Eden Kop in the east.

The distribution of the conglomerates on each horizon on which they have been observed is described in the paper. Some of them are more persistent than others, and in general they are thinner and consist of smaller pebbles than the conglomerates in similar stratigraphical positions on the Rand.

Certain strata in the Hospital Hill series, the Government Reef series, the Jeppestown series, and the Main-Bird series which possess characters rendering them valuable aids in addition to those already known for the purpose of correlating beds in more distant areas with the succession in Heidelberg, and through that with the strata on the Central Rand, are described in detail.

There was also a discussion of the belief, prevalent in some quarters, that in Heidelberg the representative of the Van Ryn reef is to be found amongst beds which are regarded by the Geological Survey as lying above the Kimberley slates. It is shown that this belief is based upon incorrect data; that the maps published in support of it are inaccurate through errors in the position of outcrops of the Nigel horizon ranging from 500 yards to six miles having crept in; through the existence of important faults and large intrusions of ingeous rocks having been overlooked; through the information to be got from the systematic and accurate record of position and dip of outcrops having been dispensed with; through the bird amygdaloid on Marais drift, and to the south of that farm having been mistaken for the Nigel slates, and perhaps through boulders of banket in the coal measure conglomerate having been mistaken for outcrops of banket in place. It is also shown that certain observations on cores from bore-holes, held by supporters of the erroneous correlation of Kimberley reefs in Heidelberg with the Van Ryn, to prove that the bird amygdaloid is an intrusive rock, are wrong, and that the amygdaloid is a contemporaneous lava flow. It is also pointed out that the following assumptions made by the supporters of the erroneous correlation are mistakes: (1) a great unconformity at the base of the Ventersdorp formation, on account of which that formation in Heidelberg rests upon strata several thousand feet lower in the succession than it does in the Klipriversberg; (2) the persistence of character in individual beds of conglomerate on their several horizons wherever they are developed; (3) the existence of a fault between the Cason and Blue Sky shafts on the eastern side of which the beds are displaced towards the south, so that a reef with slate footwall in the east is brought into apparent continuity with a reef with quartzite footwall on the west. It is pointed out that the change in the nature of the footwall can be followed in detail, and that the reef is one and the same bed throughout.

The writer of the paper states that in his opinion, after investigation of the question by purely geological methods, the only way it could be decided, there is no doubt whatever about the mistake in correlation. He apologised for reiterating before the Society much that was well known concerning this question; but he pointed out that some of the arguments against the mistaken correlation are greatly strengthened by the results of the detailed mapping in Heidelberg, and that while there is little doubt that some of the Kimberley reefs will be payable in the future, and that attempts to prove them on their merits are worthy of encouragement, an error in correlation, such as that indicated, gives rise to expectations that are not justified.

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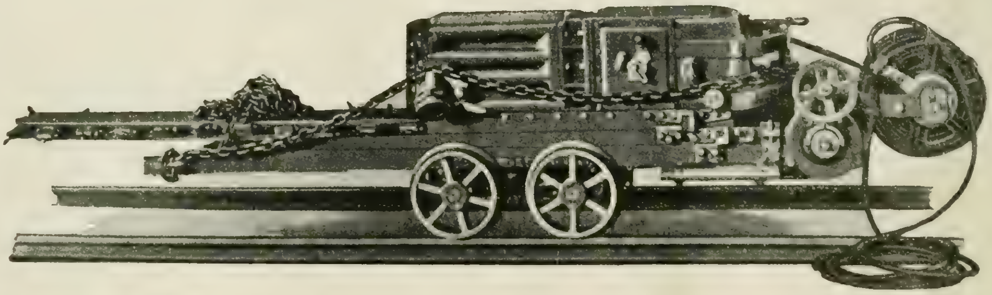

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ETC., ETC., ETC.

Our Economic Conditions Analysed.

MR. W. POTT ON THE SITUATION.

Speaking before the Transvaal Landowners' Association last week, Mr. Wm. Pott made a useful and interesting analysis of the economic position of this country in the past year. *Inter alia*, he said:—

The year 1920 is one in which the wreckage of the storm of war has been thrown upon the beach and we only now begin to see the damage to civil life and industry. The immense war dumps accumulated for carrying on the war have been thrown on a European market unprepared for their consumption, and this has led to a complete upsetting of normal industrial progress. Stocks ordered at high prices are being delivered in South Africa when there is little prospect of realisation at a profit. Merchants, however, in many cases have large profits reaped in the earlier days of war to set against loss now certain to be incurred. Once the industrial world settles to work, which unfortunately it cannot be said to have done yet, the glut and congestion will be gradually cleared away, but until the labour world recognises and acknowledges that economic principles must govern commercial and industrial progress, liquidation of the position is well-nigh impossible.

Failure of Conciliatie!

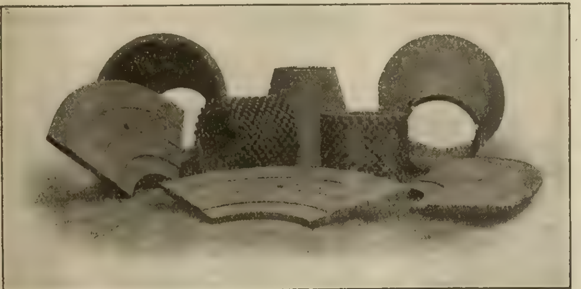
We all know that with the highest motives the Birrel policy of sweet reasonableness and milk of human kindness failed dismally in attaining its end in Ireland, and I think in mining matters the same policy has largely failed here owing to one section of Labour, suffering from a swollen head, mistaking amiability for weakness. Without discipline industry cannot stand. Concessions granted Labour, in some cases only in justice, in others more to keep the peace and enable success in war to be attained, are jealously retained in spite of altered conditions. Readjustment of values must of necessity mean readjustment of war wages and prices generally, and we can only rely on the British people's genius for reasonable compromise to attain this. Agricultural interests are so closely interwoven with other commercial interests that we suffer equally under such circumstances, and this is seen very markedly in the collapse of values in wool, hides, mohair and maize. Land passed hands more freely than in thirty years' experience I have ever known it do. In the Free State sheep country prices were unduly inflated in reflection of inflated wool prices and the suddenness of the fall consequent upon release of accumulated Government stocks has upset the calculations of the shrewdest and most far seeing.

Credit and Prices.

Land has, in my opinion, never previously been unduly high priced in South Africa except in a few isolated cases in ostrich districts, but in 1920 prices of Free State sheep land were higher than to-day's stage of development can maintain, and a more normal basis is likely to rule for some years. Credit has been perhaps excessively utilised in hope of longer maintenance of high prices and the shock of the fall reacted through the banks, so that even sound transactions were difficult to finance. Transvaal land has not yet reached such high prices, and in the cattle and cotton areas to the North, North-West and North-East, land has been, and is yet, sold at low prices. Settlement there has in the past been backward, but the last two years have shown a great influx of settlers, and cotton, citrus and cattle are being developed in a very satisfactory way. South Africa is basally sound as a rock, and there is more money here than there has ever been before, and allowing for cases of weakness due to over-speculation, liquidation of the position will, I am confident, be accomplished without serious set-back, but time, care and consideration have to be extended to all in temporary difficulties to minimise unavoidable hardship.

Mining.

Gold mining on the Rand is manifestly past its zenith and South Africa must look for future growth along the lines of agriculture and, I might add, coal mining, as well as local maunfacture of our own raw products. Gold mining has performed a great and beneficial function in starting development and bringing both capital and new ideas, which is also capital, and a market to South Africa. The great bulk of the population is, however, engaged in agriculture, and with South Africa's sunny sky and wide domains, we have a country worthy of development. No thinker will deny that the presence of the native who is able and willing to undertake most of the hard work and make life easy for the white man is a factor tending to deterioration, and it takes character and determination to resist that influence and to use without abusing this assistance. Once the white leaves too much to his natives and becomes slack himself, deterioration sets in, but there is a happy medium which can and should be attained which raises the native, eases the life of the farm, especially to our women and children, and does not deteriorate the white man. I am not going to belabour you with statistics—you can get those in our report and other publications. All I wish to do is to run over the prospects with a light hand, and the message I have for you is: "All's well; we have a stable Government led by a great statesman sprung from the loins of South Africa; leave politics to the Government and devote yourselves to friendly co-operation with the man next you, whatever he is, and our agriculture, local industries and mining will provide a bright future for succeeding generations."



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Geduld Progress.

VERTICAL SHAFT NEARING REEF.

Geduld shares have been a cheerful feature of an otherwise quiet market for gold shares in the past few days, and have improved substantially in price both locally and in London. The chairman pointed out at the recent annual meeting that the sinking of the No. 7 shaft was delayed somewhat during the first half of the year, owing to the large quantity of water encountered. After this water difficulty was overcome much better progress was made. The total footage sunk for the year 1920 was 1,198 and, in addition, pump chambers and sumps were cut at depths of 600 ft. and 1,400 ft. At the end of April last the shaft had reached a depth of 2,190 ft., and the consulting engineer expects that the reef should be intersected in June. The connection of the shaft with the crosscut from the 7th level will be completed towards the end of July.

The chief feature of last year's development was the disclosure of a block of very high-grade ore on the No. 7 level, in the neighbourhood of the new No. 7 shaft. The total footage exposed in this area at the end of April was 4,215 ft., of which 66 per cent. is payable and averages 16.1 dwts. over an estimated stoping width of 66 in. A very substantial body of high-grade ore has already been developed in that section of the mine. The limits of the chutes have not yet been determined, but there are good grounds for the expectation that, as development proceeds, a further large ore tonnage of high value will be disclosed.

Owing principally, but not entirely, to the good development results in the No. 7 level area, the ore reserves were increased by 640,000 tons, making the total at December 31 last 3,220,000 tons. The value of these reserves has increased from 7.4 dwts. in 1919 to 8 dwts. in 1920, the stoping width remaining unchanged at 61 in.

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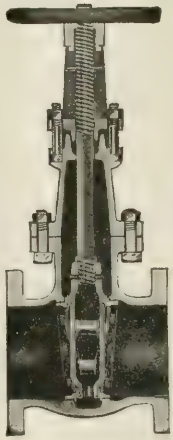

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World's Gold Production.

DETAILED RETURNS FOR LAST YEAR.

The steady drop in the world's gold output, coming at a period when the metal is more than ever necessary to restore the stability of the currency systems of the world, is reflected in the following authoritative figures. They also lend point to the remarks by Mr. Samuel Evans at the Crown Mines meeting on the coming famine in gold.

It is a curious fact that, at the very moment when the need of the world for gold has become most acute, the rate of production should continue to decline. Ever since 1915, when the total production reached £96,525,000, there has been a steady falling off in the quantity produced annually. Returns to hand for 1919 show that the total has dropped from £78,221,700 to £75,017,766. Figures are not yet complete as regards 1920, but from the available data it seems almost certain that the total will not exceed £69,500,000. How the various countries have contributed to these amounts can be seen from the following table:

The World's Gold Output.

	1920.	1919.	1918.	1917.	1916.
Transvaal	£34,652,906*	£35,402,887*	£35,768,687*	£38,323,921*	£39,485,000*
Rhodesia	2,348,112*	2,499,498*	2,652,250*	3,495,353*	3,895,000*
West Africa	1,000,000‡	1,237,362*	1,333,553*	1,529,970*	1,615,000*
Total Africa	38,001,018	39,139,747	39,754,490*	43,349,244*	44,995,000*
West Australia ..	2,575,000§	3,118,113*	3,723,200*	4,121,700*	4,508,500*
Queensland	450,000§	514,103*	578,200*	761,700*	914,000*
Victoria	640,000§	575,260*	674,700*	857,500*	1,090,000*
New South Wales ..	197,000§	279,666*	370,000*	349,000*	459,000*
South Australia	25,000§	13,696*	32,700*	34,000*	35,500*
New Zealand . ..	1,100,000‡	1,334,405*	1,100,000*	1,189,200	1,199,000*
Tasmania	27,000§	32,650*	48,000*	61,600*	67,000*
Total Australia	5,014,000	5,867,893	6,526,800	7,374,700	8,273,000*
India	1,889,261*	1,959,977*	2,060,000‡	2,213,800*	2,295,000*
Canada	3,290,000‡	3,260,468*	3,016,000*	3,174,586*	3,952,500*
Total British Empire ..	48,194,279	50,228,085	51,357,290	56,112,330	59,515,500
United States	10,500,000‡	12,404,169*	14,064,410*	17,197,300*	19,102,500*
Mexico	2,750,000‡	3,135,512†	2,500,000‡	1,848,000†	1,579,200‡
Russia	1,000,000‡	2,000,000‡	2,500,000‡	4,000,000‡	5,500,000‡
Other Countries . .	7,000,000‡	7,250,000‡	7,800,000‡	7,822,370‡	8,233,800‡
Grand total	£69,444,279	£75,017,766	£78,221,700	£86,980,000†	£93,841,000†

* Official returns, † U.S. Mint figures. ‡ Estimated. § Estimated from official returns for first nine months.

The outstanding feature, says The Statist, is the large proportion of the gold that comes from the British Empire. Out of a total of £75,017,766 for 1919 we furnished no less than £50,228,085, or over two-thirds. During 1920 our contribution reached 69·5 per cent. of the total. This position is entirely due to the celebrated mines of the Transvaal, which provided £35,402,887 in 1919 and £34,652,906 in 1920. Incidentally, let it be noted that, in order to maintain an effective comparison, these figures have reference only to the standard value of gold, the influence of the gold premium being ignored. The decline in the output from this region is the cumulative result of more than one factor. In the first instance, no less than eight of the mines that produced during 1919 dropped out before the close of 1920. A second factor was referred to by Mr. Henry Strakosch at the Brussels Conference. "The diminution of output, it was clear, had been brought about by increased cost of production, which was unaccompanied by a corresponding rise in the value of gold." Not only in South Africa was this cause operating; it was world-wide, as will be admitted by anyone who has read the reports of gold-mining companies, whether domiciled in Johannesburg, Rhodesia, India, Australia, Canada, Mexico, or the United States. It was not only stores and materials that proved more costly. The Chamber of Mines in South Africa had to grant large increases in wages to both native and white employees. Australian companies complained of the increases sanctioned by the Australian Courts. As regards the Transvaal, the final result can be measured to some extent by figures recently supplied by the Chamber of Mines to support its refusal of a demand for a further increase in wages. In the case of thirty-nine producers the average cost of producing an ounce of gold between January and November, 1920, is stated. With gold at 85s. an ounce only fifteen of these companies could afford to produce under existing conditions. The other twenty-four mines record costs varying from 85s. 10d. per ounce in the case of Van Ryn Estate to 109s. 9d. per ounce in the case of Luipaard's Vlei. The increased contributions levied under the new Miners' Phthisis legislation has also played a part in this high cost. Strikes have undoubtedly restricted production in certain areas. More than one Australian mine was handicapped by labour disputes during both 1919 and 1920. In Rhodesia lack of adequate transport facilities has also to be taken into account. In most of the leading producing areas there has been a shortage of labour. This was particularly the case in South Africa, where the mines were unable, in the majority of coses, to secure anything like a full complement of native labour.

It is interesting to note that the small increase in the Canadian output is due entirely to the record production in Northern Ontario. Out of an estimated total of $16,000,000 at least, this region supplied no less than $11,500,000. As regards production outside the British Empire, the available data is more scanty. In view of the gigantic upheaval in Russia the reduced estimate of £1,000,000 may even prove too large; but, on the other hand, £10,500,000 seems conservative for the United States, and in view of the great improvement in the political complexity of Mexico, the output from this region may be found to be more than is estimated.

The advent of the premium on gold since July, 1919, has brought to many of the producers of this precious metal an additional revenue of no inconsiderable amount. Owing to lack of uniformity in statistics, it is not possible to measure this benefit for the whole output. Moreover, as regards the Indian mines, because of an agreement with the Government, they were not able to reap the benefit of this premium until after May, 1920. How this premium must have revolutionised the position of many gold-mining companies can be seen by studying the effect as regards the Transvaal region:

Transvaal Gold Production.

Year	Quantity Fine Ounces	Value at Par £	Value including Gold Premium £
1914	8,394,322	£35,616,814	—
1915	9,093,902	38,628,437	—
1916	9,296,618	39,489,522	—
1917	9,018,084	38,323,921	—
1918	8,418,292	35,768,687	—
1919	8,330,091	35,402,887	£38,402,887
1920	8,153,625	34,652,906	44,641,096

Thus in 1919, when the premium had been in operation only for a little more than five months, the Rand gold mines secured an additional income, according to Sir Evelyn Wallers, of £3,000,000. For 1920, when the premium was in operation during the whole year, the extra revenue reached nearly £10,000,000. This estimate is derived by valuing the output at 109s. 6d. per ounce, which is the average of the monthly values declared by the Johannesburg group. Moreover, as a conservative tendency was adopted in fixing these monthly values, it may be taken for certain that £10,000,000 represents the minimum received in this manner. Incidentally, the table shows the manner in which the quantity of gold secured annually in the principal producing region in the world has been declining since 1916, when it reached 9,296,618 ounces, until 1920, when it amounted only to 8,153,625 ounces. In his speech at the Brussels Conference, Mr. Strakosch maintained that this tendency would continue and that henceforth we would have to expect a decline in the quantity of gold produced annually by the world as a whole.

African City Properties Trust and the Future of Johannesburg.

The African City Properties Trust, Ltd., has had a prosperous year. Speaking at the annual meeting in London in mail week, the Chairman said: "We are recommending the payment of a dividend of 7 per cent.—that is an extra 1 per cent. over the rate paid last year. We also propose in future to pay interim dividends instead of one dividend at the end of the year. The exact date when the interim dividend will be paid cannot be fixed now, but it will be approximately six months from the present time, when we have received the accounts for the first six months of the year and if they are satisfactory." Regarding the future of Johannesburg, the Chairman said: "As to the future of Johannesburg and South Africa, some pessimistic statements have appeared lately, arising from the fact that certain of the mines have been worked out and consequently have been closed down and liquidated. It is a matter entirely for consideration and for experts to say whether the mines which are being opened on the East Rand will replace those which are being closed down in other parts, or whether one lot will outweigh the other or not. I will not say, but I will point out that Johannesburg is the principal city in South Africa now by a very long way. It has a population of about 260,000, of whom about half are whites and half are blacks; it is the railway centre, and it is the centre of vast agricultural resources. There are immense coal deposits in the neighbourhood; there are iron and other minerals there, and when you consider all these things, and the energy and enterprise of the people, as shown by those who are taking our premises on leases of five and ten years if they can get them, you will understand that they do not believe that Johannesburg has by any means reached the zenith of its prosperity. There is to be an immense station built there, at a cost, I believe, of £1,000,000; there are a large number of workmen's dwellings being put up in the neighbourhood with the assistance of the Government; there is a university being put up, and a large number of students were actually enrolling themselves before the building was started. Altogether, I see for Johannesburg a wonderful future, and this company, I have no doubt, will give satisfactory returns not only during our lives but those of our children."

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Letters to the Editor.

HEIDELBERG GEOLOGY

Mr. Bleloch Replies to Dr. Rogers.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—As a summary of the latter portion of Dr. Rogers' paper on the "Geology of the Neighbourhood of Heidelberg" has been sent to the Press, I will be grateful if you will publish the following statements in regard thereto:—

(1) That the conclusions come to by Dr. Rogers are founded on his own and Dr. Mellor's opinions, and that they are not generally accepted by prospectors or by many geologists.

(2) That Dr. Rogers has only had three years' experience of the Rand Beds, while those who have come to other conclusions have had erperience extending over 5 to 10 times as long. My own experience in active research and work on these beds has extended over 25 years.

(3) That against Dr. Rogers's conclusions there is the concrete fact that the Van Ryn Reef, now opened with payable values, on (1) The Southern Van Ryn Mine; (2) Klippoortje (Houtpoort, Ltd-; (3) Boschfontein (Nigel Transvaal Goldelds); (4) Wilgepoort (Coronation Syndicate); (5) Rooiwal (S.A. Nitrate and Potash Corp., Ltd.). At all these places the reef is identical in appearance and character to the Van Ryn Reef in the great mines of the Far East Rand, and I believe that in the case of Welgepoort, Dr. Rogers has recognised the reef there to be the Van Ryn. On Klippoortje (Houtpoort, Ltd.), where the reef is now being opened from its outcrop, it is so absolutely and obviously the same as the reef outcropping at the New Modder that there is no room for error. The reef here pans from 5 to 20 dwts., with occasional rich pannings up to 3 ozs., right from the grass roots. So far as I know, Dr. Rogers, like his predecessor, Dr. Mellor, does not use a gold pan. In fact I never heard him mention the word gold in the course of his long lecture.

(4) That the banket of the Van Ryn Reef is quite unlike that of the Nigel Reef. Mr. Danks, the special correspondent of the "South African Mining and Engineering ournal," sent out expressely by htat paper to investigate this question of the separate identity of these two reefs, came back and reported that after examining the evidence and seeing the reefs, no man could say that the Nigel is the same as the Van Ryn.

(5) That "In The Strange Conduct of Mr. Malan," pages 11 to 15, I have cited over twenty authorities in agreement with our conclusions, and among these is Dr. Molengraff, formerly State Geologist to the Transvaal, probably the greatest geologist who ever came to South Africa.

(6) That the Molyneux Reef, in the Heidelberg District, which we contend Dr. Mellor and Dr. Rogers mistakenly identify as the Van Ryn Reef or Main Reef Leader, is, on Dr. Rogers' own admission extremely inconstant; in fact it is so inconstant that in many places along its line Dr. Rogers has to admit that it does not exist except as a mere contact. That 25 years ago many shafts were sunk on the reef or on its contact, at a cost of £150,000 to £200,000. Over the many miles of outcrop which these shafts tested, the results were so generally poor that not a single successful mine has ever been established on the reef. Dr. Rogers' reef is, therefore, impossible as the basis of any great mining enterprise, as many engineers of the big houses, who haxe examined it must confirm, and Dr. Rogers's mistake in identifying it as the Heidelberg representative of our two chief gold-bearing reefs—the Van Ryn and the Main Reef Leader—if accepted blindly and acted upon, will bring our gold mining industry to a premature end and lead this community, if not the whole country, to ruin.

(7) That against this the real Van Ryn Reef discovered by us is a constant and continuous reef extending for 25 to 30 miles in the Heidelberg Area and for over 20 miles in the Balfour Area, and it is not only constant but it carries highly payable gold values wherever it has been developed on.

(8) Dr. Rogers tries to save himself and his Department from the consequences of the condemnatory cables sent to the High Commissioner in London last year by using the words, that "while there is little doubt that some of the Kimberley reefs may be payable in future, etc." In using these words he admits that our reef may be payable. He goes on to say that "attempts to prove them on their merits are worthy of encouragement." Why, then, the necessity of his own mere opinion about wrong identification for which I submit the evidence of the reefs themselves is completely against him, for the indecent haste he and his department showed in sending these cables, which stopped £1,000,000 new working capital then being provided to prove these very reefs he now says there is little doubt may be payable. In regard to our Van Ryn Reef being one of the Kimberley Reefs, all those who have seen it agree in saying that they know of no reef in the Kimberley series like our reef. The only reef like it in the Far East Rand or anywhere else is the Van Ryn Reef of the New Modder and the other great working mines of that great goldfield. Dr. Rogers would do well to take his own advice and act only with extreme care in matters of economic geology; there are so many surprises. He is more at home and on much safer ground in his descriptions of the constitment minerals of ingenous rocks with which his paper abounded. These at any rate can do little harm.

(9) That if Dr. Rogers' reef is the representative in the Heidelberg District of our two chief gold-bearing reefs, why has the Government not caused the ground on the line of that reef to be proclaimed as a public goldfield? Not a single farm on that line in the Heidelberg area has been so proclaimed; yet ground on the line of our reef has been proclaimed and probably over £100,000 has been collected in claim licence moneys from the claims which the Government cables condemned, on which Dr. Rogers now admits there may be payable reefs. It should be noted that the Gold Law provides that ground shall not be proclaimed unless the Government is satisfied of the existence of payable gold on it. Will Sir Robert Kotze or the Right Hon. the Minister of Mines explain these anomalies?

(10) Dr. Rogers claims his arguments to be the only arguments based on truly scientific methods. I will say in reply that the determination of the identity of sedimentary rocks at widely separate places by means of the position of igneous rocks whether, sheets sills, or even contemporaneous lava flows, is a most dangerous and unscientific method liable to result in grave error. It is a method not recommended so far as I know by any great Geological Authority. On the contrary students are frequently put on their guard against it. It is this very method which has led Dr. Rogers and Dr. Mellor into errors which have made them the laughing stock of experienced prospectors who know these reefs. I will deal fully with this method which Dr. Rogers has adopted in my contribution to the discussion at an early meeting of the Geological Society of South Africa and meantime will only make a few further brief comments on it as follows:—

A lava flow proved to be a contemporaneous lava flow at Heidelberg may not be the same identical lava flow as one, say, at Government Areas, Modderfontein. Dr. Rogers must admit that one diabase of that period is very like another, and to prove that diabase amygdaloidal or otherwise, occurring so far apart as Modderfontein and Heidelberg, even if both flows are one and the same flow, I submit can only be done by means of the distinctive sedimentary beds occurring above or below them in each place. If there be a marked dissimilarity between the sedimentary above or below the one and those above or below the other, such dissimilarity is real evidence that the diabases belong to distinct and separate flows. That, I submit, is the sound and correct argument. Moreover, the behaviour of the diabases as revealed in the Government Areas Shaft sections and in the sections from surrounding mines of that area provides the strongest evidence that the diabases there are not contemporaneous flows, but intrusive sills which vary in number and position from shaft to shaft. I submit that the fundamental error into which Dr. Mellor and Dr. Rogers, learned as these gentlemen are, lies in identifying the reefs by the diabases instead of the diabases by the reefs.

(11) It is evident from what I have written above that if Dr. Rogers' conclusions are correct, the doom of our Rand gold mining industry is sealed, but I say to your readers and to the people of South Africa: "Do not believe it." We have practically virgin extensions of our great gold bearing reef, the Van Ryn Reef of the Far East Rand, for at least 50 miles in the Heidelberg district, and when that is finished there are fifty miles more in another part of the country, and these more comforting conclusions are supported by:

(a) The Van Ryn Reef itself and the gold it contains open for all to see and examine at the places I have named.

(b) The twenty authorities referred to above. (In regard to this I do not think Dr. Rogers could get any geologist who has examined the discoveries of recent years to agree with him except Dr. Mellor.)

In appealing for consideration of the conclusions of those who with diamond drill and with pick and shovel and gold pan are the real discoverers of the gold reefs which are the basis of our great mining industry, I would remind the public that every such reef was found by the ordinary men of the country, and that it is no new thing for the scientific doctrinaire to come along and condemn their work and throw doubt on its results. I would ask has it been the real prospector or the doctrinaire scientist who in the history of these fields has usually been right, and who has been of the greater benefit to this country? In view of the impending crisis which is coming in our industry like an avalanche, with ruin for all coming on behind, I say these are questions which every Statesman, every member of Parliament, every editor, every director, and every citizen would do well to consider.

Finally, I state emphatically, and it cannot be denied by Dr. Rogers or any one else that our Reef—our Van Ryn Reef—is the only gold bearing reef in the extensions southwards of the Far East Rand, which has the appearance, the character, and the gold of the Van Ryn Reef, and it is the only reef there which stands between this community and certain and rapid ruin.

I am,
Yours faithfully,
W. E. BLELOCH.

RAND MINING ECONOMICS.

Mr. W. T. Hallimond's Views.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir, Having been in the Low Country, N.E. Transvaal, for some weeks, I have not had the opportunity of perusing the issues of your "Journal" during that time until within the last few days. Your issue of the 26th March contains several articles and letters of special interest, to some of which, with your usual indulgence I would like to refer, and briefly as possible to add some suggestions, which, as one of the oldest mining engineers of the Transvaal, I feel it my duty to subscribe. Your article in the issue referred to, on the Chamber of Mines meeting, is one calculated to set men thinking Before proceeding I must congratulate you upon your clear and unbiassed criticism of the President's first "speech from the Throne." You are not singular in your surprise that Mr Buckle "did not make a bigger point" with reference to working costs, and I cannot agree that Sir Lionel Phillips, Bart., was either wise or diplomatic in his warning to all and sundry. It is with regard to the views of Sir Lionel that I would like to draw the attention of your readers.

One wonders, when you hear from such men as Sir Lionel and other leading capitalists, whose speeches we have recently read, whether they are absolutely sincere. If they are, why go to the great expense of such buildings as the New Chamber of Mines—a photograph of which also appears in your issue of the 26th March—why go on with such expensive shafts as are being put down at present to "beat all records" in depth (and cost per foot as well), and why not make shift with what exists if the gold industry is on the wane" as Sir Lionel asserts?

He asks himself the question, "Whether the peril in which all the mines now stand could not have been avoided by the exercise of a little goodwill." Sir Lionel might have added: and of a little self-sacrifice on the part of those who have done so well out of the industry and of the exercise of more drastically reductive measures beginning with the most costly departments in head offices (due to overcentralisation) down to the last item of working costs, especially those of stores and mining material.

In the face of the fact that cost of living is coming down I am of the opinion that there is a majority of men amongst our "labour friends" who are willing also to "face the present position" and will accept any reasonable reduction that the Chamber of Mines proposes. The labour position in England to-day will not act as an incentive to do likewise, but will have the opposite effect on the labour classes if I judge them rightly. After the late Anglo-Boer War from 1904 to 1908, we reduced working costs at one mine of which I have the evidence, from over 20s. down to 14s. per ton, and included in this period we had the 1907 strike, and at the mine referred to we had at one time over 200 unskilled whites working at a minimum of 7s. 6d. per shift.

There seems to be but one note struck by all the Chairmen of Companies in their annual speeches, and that is that many mines are only working because of the higher price of gold, and "in fact many ought to be shut down now." These gentlemen should certainly know better than an outsider what their mining costs are, but is the whole of the remedy for high costs to come from the Labour friends and from people outside the mining industry? Sir Lionel has given a few useful pointers—perhaps not intentionally—to competitors in your forthcoming "Essay Competition," and I feel sure the opportunity offered by you to freely set out one's views with regard to "efficiency and the lowering of costs" will be highly appreciated and taken advantage of to the fullest extent. Will these essays have any effect on the mining groups? I sincerely hope they will.

I have also read with intense interest the article by Mr. W. P. Taylor. I dare not trespass further on your space, but will take a later opportunity of giving evidence, which I have gained in support of Mr. Taylor's views with regard to gold-bearing reefs in the shales as quite distinct and independent of the Main Reef series, where mines both large and small, are already working and where, if the Government would amend our Gold Laws, thousands of unemployed could find work and the smaller capitalist would find an honest opening for investment without the risk which is always existent in dealing on the Stock Exchange.

I would, in conclusion, offer also a word of warning to the small capitalist. Do not "buy a pig in a poke," but once assured you have a reasonable proposition offered—and there are many such to be obtained—go for it! Possess your own mine instead of gambling in the shares of these mines, which we are told "are on the wane," and many of which "ought to be shut down now."—I am, etc.,

W. T. HALLIMOND,
M.I.M.M. and M.I.M.E.

13, Central House,
Johannesburg.

British Chamber of Commerce for Madagascar.

A British Chamber of Commerce for Madagascar has been formed with headquarters in Antananarivo, the Secretary being Mr. A Lebrun, Rue Amiral Pierre, Antananarivo H.M. Consul at Antananarivo states that the consent of the local Administration to the forming of the Chamber has been obtained, and the necessary particulars have been forwarded to the United Kingdom in order that the Chamber may be registered. The articles of association follow those of the British Chamber of Commerce, Paris, with such alterations as are rendered necessary by local conditions.

Coal and Oil in Siberia.

We are indebted to Dr. Heyman, who has lately escaped from Siberia, for the following notes on the coal deposits of that country, now, however, a prey to unrest and what he calls "alarming inefficiency."

Coal.

As is well known, Russia has gigantic reserves of coal extending over a vast area and varying from lignite to anthracite. In the Donetzky area coal is found over an area of 15,000 square miles, and the output in 1907 was 2,000,000 tons. The Moscow coal district is in extent 180,000 square miles. Not of less importance and magnitude are the coal deposits of Siberia. In the Urals a coal of medium quality is mined; the output for 1906 was 850,000 tons. I do not know the later outputs. In the Tomsk district the coal deposits extend over an area of about 10,000 square miles and further east we come on the important deposits of Cheremuchovo, which had an output of 1,500,000 tons in 1906. In the immediate neighbourhood of Vladivostock there are many low-grade mines; a very good general utility coal is mined 30 miles from the town at the Government owned Suchan mines.

Analysis.

I have visited these mines, and samples taken and analysed by me gave the following results: Fixed carbon, 59.20 per cent.; volatile matter, 28.40 per cent.; sulphur, 0.40 per cent.; ash, 10.20 per cent.; moisture, 1.80 per cent. No calorific determination was conducted, but calculation makes out the calorific value to be in the region of 13 lbs. The samples taken by me were not seam samples, so the above analysis does not necessarily show the true value of the coal deposit; the coal, however, is clearly of high grade and of considerable value. Meantime very little coal is railed from Suchan to the coast, owing to railway inefficiency, and not more than 350,000 tons per annum is handled by the railway authorities. The coal yield during the last four years from the Suchan mines is as follows:

	Coal Produced per annum (Tons)	Workmen Employed.	Output per annum per workman.
1917	316,000	2,394	132
1918	227,000	2,245	101
1919	134,000	1,972	68
1920	82,000	1,357	60

The diminishing output is clearly due to the state of unrest in the country, and the working inefficiency is so alarmingly low that coal is being imported from Japan at a very high cost to meet the demand of Vladivostock and shipping.

Other Deposits.

The Russian part of Sakhalin abounds in high-grade coal. The coal from this district is well suited for steam-raising purposes, but again the production has fallen off to an alarming extent, so that local requirements are not met, and at present coal is being imported from Japan at not less than £5 per ton. This state of affairs is very appalling, as the abundance of coal convenient to the coast is not only more than sufficient for local needs but amply allows of export to the Oriental markets. According to estimates made by the engineer Polevoy, the coal reserves in the Far East alone—comprising the following districts: Amur, Burega, Terminekey, Zeia, Maritime, and Sakhalin Provinces—totals 2,819,928,000 tons. The highest annual output for these districts only totals 600,000 tons.

Oil.

On the eastern coast of the Russian part of Sakhalin Island oil was discovered many years ago. Very little geological research has so far been carried out, but according to all indications the possibility of extensive oil discoveries are not remote, and it is possible that in the near future this district may figure prominently as an oil producer.

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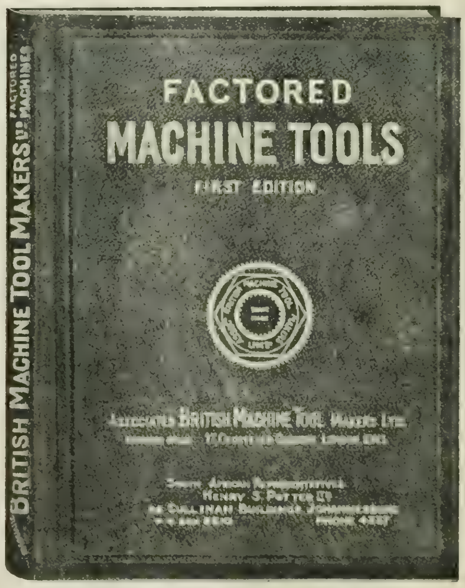
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EDITORIAL.

THE WAGES DISCUSSION.

In view of the position of the industry, it was inevitable that the Chamber of Mines should " put it up to " the men that a " cut " in wages was imperatively called for; and Mr. Buckle did not mince matters in explaining the need for a reduction to the Union leaders last week. The President of the Chamber, after stating that at the time (February, 1920) the flat increase was granted gold was 127s. 6d. per fine ounce, said the price was now in the neighbourhood of 103s., which meant a diminution in the annual earnings of the gold mines of nearly ten millions sterling, on which basis several mines were making actual losses to-day, and that unless a reduction in working costs could be effected a considerable number of mines could not carry on. The cost of living was also dropping; the highest point reached was in October, 1920, when it was about 57 per cent. above the 1914 rates, since which date the cost had already declined, the figure for April giving the increase as 38.4 on pre-War prices. In these circumstances the Chamber thought the employees would see the desirability, as well as the necessity, of a reduction in the rate of wages. Mr. Buckle referred to the universal cut in wages and mentioned several reductions agreed to by workers all over the world. The Chamber of Mines' proposals amounted to an 11 per cent. drop, and as the increase was a flat rate it was only fair and reasonable that the decreases should also, as far as possible, be flat. It was therefore proposed that there should be a flat cut of 3s. per shift, or 18s. per week, off all the workers who got the £2 8s. a week increase. As the matter was urgent it was proposed that such reduction should take effect from July 1 next, and in respect of mechanics from January 1 next year. That such a reduction in wages is imperatively necessary if many of our low-grade mines are to continue working is apparent to everyone, after reading the reports during the past week of such companies as the Village Deep, Geldenhuis Deep, Aurora West, New Kleinfontein, Roodepoort United, and New Goch, to mention but a few of the companies. Mr. Buckle did not fail to emphasise the fact that the generous grant of 8s. in February of last year was clearly made and accepted as being subject to review and reconsideration when circumstances changed. That they have changed materially he had no difficulty in showing. Mr. Buckle, at the request of the Unions, has now put the whole case in writing; and that statement is now being studied by the men concerned. On the men's side, we shall be told, of course, that: (1) Economies must be effected otherwise than by reducing wages, or (2) that a higher price for gold must be insisted upon, or (3) that only wages on the low-grade mines need be reduced. Replies to all these arguments are forthcoming in the speeches of the chairmen of the poorer mines reported in this and last issues. . The short answer to (1) is that economies in labour and stores have been carried out as far as possible. The poorer mines have almost all adopted, with the agreement of their men, retrenchment schemes, and the prices of stores lie outside their control. As regards (2) the price of gold is also outside the control of the mines, as it is governed by the position of international finance and exchange. In regard to (3) a moment's consideration will show its overwhelming disadvantages in practice. The Chairman of the Aurora West, it seems to us, put the objections to this argument best. He said: " Suppose we were, by arrangement with our men, to reduce the scale of wages on the Aurora West mine, without a similar reduction being brought about on the other mines of the Rand. What would happen? It seems to me obvious that all our skilled workers immediately would seek more remunerative employment on properties where the pay had not been reduced—it would be only human nature if they did so—and that we should have nothing left but a residue of inefficients. In such circumstances it would be clearly hopeless for the mine to continue operations, and for this reason we have not suggested any such scheme to our men. It may be argued that if the low-grade mines generally were to to reduce their scale of white pay, the large number of men affected would be unable to find employment at higher rates on other mines. This may be true so far as the near future is concerned, but in the long run the mines paying the highest wages would have the best men, and the low-grade mines, to whom efficiency is vitally necessary for their existence, would be even worse off than under present conditions. It naturally follows that, whatever reduction in wages is to be effected —and, if we are to save a large proportion of the white inhabitants of this country from future misery and starvation, it must be taken in hand at once—it must be general. It is to be hoped for the sake of all concerned, and most particularly for their own sakes, that the men will realise this position and accept the inevitable before it is too late." The Albu group has, unfortunately for it, more than its share of low-grade mines; and its chairman has, therefore, a special right to be heard on the present " exceedingly critical situation." His considered opinion is that the only avenue of economy open lies in a reduction of the existing cost of living allowance granted to white employees since the commencement of the War. " I am somewhat averse to making suggestions of this nature," he said, " but I think you will agree that if, under the conditions of unemployment now prevailing in this country, the position were allowed to become accentuated by mines closing down on account of their being compelled to pay excessive wages, it would be a most unfortunate error, and one which would affect the workman himself more than any other class of the community." In a notable appeal to the better sense of the men, Sir Wm. Dalrymple, at the New Kleinfontein meeting, uttered some grave words of warning. "There are many companies in a similar position to ours," he said, "and I wish to take this opportunity of sounding a serious note of warning to employees that, when they are approached to submit to a reduction in the very liberal allowances which the industry was able to make in connection with the increased cost of living, owing more particularly to the high gold premium prevailing at the time these allowances were granted, they should not constantly focus on the profits of the half-dozen richer mines, but rather on the position of the low-grade mines, many of which are, with the utmost difficulty, just managing to keep their heads above water. These mines are large employers of labour at full current rates, and the slightest adverse turn of the scale will put the finishing touch to some of them. If, however, employees face the position, and agree to substantial reductions in the cost of living allowances, and in addition, co-operate to improve efficiency, such mines may yet continue to give remunerative employment for some years to a large number of men, and perhaps provide some small return to the unfortunate shareholders; while the importance of extending their lives so far as possible is incalculable alike to the Government, the railways, the commercial and farming community, and to the country at large." At the Rand Mines meeting on Thursday Sir Harry Ross Skinner showed that working costs in that group rose from 1915 to 1920 by no less than 8s. 1d. per ton milled (equivalent to an increase of 44.8 per cent.), of which white wages, exclusive of holiday pay, account for no less than 3s. 8.8d. per ton, or in other words, the cost of direct white wages per ton milled had increased by 77.7 per cent. He declared: "Had this very large increase in wages been accompanied by a corresponding increase in efficiency, the position of the low-grade mines would not be what it is to-day "—a remark with which, of course, no one can quarrel. The remedy offered by the Chairman of the Rand Mines is a drastic one, but seems the only one offering. The survival of the poorer mines, he says, "*depends on a decrease in expenditure, and such a decrease can only be effected by an all-round improvement in efficiency, which would be materially assisted by a diminution in the number of superfluous employees, coupled with an all-round reduction in wages.*" The italics are ours. We have not seen the case better, certainly not more briefly, put. To enlarge upon or expand its message might merely weaken the effect upon those to whom it is primarily and directly addressed.

THE WEEK'S MEETINGS.

Full reports of the speeches from the chair at the meetings of the subsidiary companies of the Barnato and Albu groups will be found in this issue. At the Barnato meetings the Chairman, Mr. John Munro, it will be seen, confined himself to a brief and most businesslike review of the results of the year. He showed that litigation with Sir Joseph Robinson over Randfontein was not yet quite ended, and he was able to indicate an early successful completion of the great reorganisation scheme of working at the "Central." At the State Mines it was not contemplated to add further to the existing reduction plant, but Mr. Munro made an interesting reference to the big ventilation scheme in view at that property. Equally satisfactory was the review of results from the Van Ryn Deep, and it may be said that all the Barnato subsidiary meetings make cheerful reading at this juncture. The older mines of the group have, of course, their special difficulties, but, on the whole, they are doing wonderfully well in the face of increasing old age and working costs. The annual meetings of the General Mining subsidiaries naturally evoked from the Chairman, Mr. Leopold Albu, who presided in the absence of Sir George, some very plain speaking on the subject of working costs. This group is particularly hard hit by the increased costs; and apart from the Meyer and Charlton and the Van Ryn Estate (which holds its annual meeting in London) all its mines have undergone a most trying time since the increase of wages and stores. We have quoted the Chairman's remarks freely on this subject in other parts of this issue, and it only remains for us to add that it would be a public calamity if the plight of the poorer mines of this group were to go unredressed. The General Mining people have in the past put up a sturdy fight to keep their mines at work; they have financed their subsidiaries with courage and enterprise, and they deserve well of the West Rand community, among whom their mining interests so largely lie. The moderately expressed and closely reasoned speeches from the chair at their annual meetings this week should therefore appeal strongly to public opinion along the Reef. If the Government and the employees do not take Mr. Albu's appeal seriously, we fear there must be a stern awakening for all if and when his sincere warnings come to take effect. Certainly never were warnings more timely, and we can only hope that they will be taken to heart.

Notes & News.

The Rand Mines Meeting.

Sir Harry Ross Skinner presided at the annual meeting of the Rand Mines, Ltd., on Thursday, and in the course of his speech reviewed the operations of the subsidiary companies of the group. He also dealt very clearly and forcibly with the present problems of the industry, notably wages, working costs, inefficiency and the gold premium, and his remarks on these all-important subjects will be read with interest by a much wider audience than the shareholders primarily concerned. A full report of the Chairman's speech is unavoidably held over till our next issue.

* * * *

New Kleinfontein Outlook!

In a few brief, pithy words, Sir Wm. Dalrymple thus summed up the outlook for the New Kleinfontein under today's conditions. "The year," he said, "has been most difficult and perplexing to all concerned, and, as I have already pointed out, the company has been saved solely by the so-called premium which we were able to obtain. This has fluctuated from time to time, and will continue to do so, but the tendency must, in the main, be downwards. On the other hand, we have reasons for hoping that last year we reached the peak of high working costs, and our endeavours for the coming year must be to get costs down to counteract the fall to be expected in the price obtained for our gold. If we cannot do that, then the outlook is not reassuring."

* * * *

A Big Near East Rand Pumping Scheme.

Some time ago we printed some preliminary details of a big pumping scheme to deal with water in the mines of the Germiston district, and we are able to give the following facts from official sources: Consequent on the Knights Deep closing, the arrangement under which that company has pumped a certain amount of water, which has been allowed to flow to it from the Rose Deep workings, has been discontinued, and an arrangement has been entered into between the Rose Deep and Simmer and Jack Proprietary Mines, Ltd., for the installation of a joint central pumping plant at the latter company's Rhodes shaft for dealing with both companies' mine water. Although this joint pumping plant will have a sufficient capacity to handle the water made in the Simmer and Jack, the Rose Deep and in the adjacent closed-down mines, together with that made in the Knight Central, Ltd., should it close down, the position of the Rose Deep and the Simmer and Jack Mine might still be seriously affected should the East Rand Proprietary Mines, Ltd., close down and cease pumping operations The amount of water making in the E.R.P.M. is at the present time approximately two million gallons per day, and it is calculated that in about three years after pumping operations cease on that property, unless the inflow of water is prevented, either by the intervening companies, namely, the Witwatersrand Deep, Ltd., or the Witwatersrand G.M. Co., Ltd., or in some other way, this water will have to be dealt with by the Simmer and Jack and Rose Deep Companies in order to prevent the flooding of the mines.

Significance of the Exchange Rate.

What fluctuations in the bank rate of exchange mean to the mines was forcibly brought home to shareholders at the Aurora West meeting. Mr. Leopold Albu showed that on the basis of last month's operations, the cost of producing an ounce of gold was 98s., in comparison with the existing price of gold. This shows that the margin of profit now remaining, even on the comparatively favourable figures, is very small indeed; and the recent increase of $\frac{3}{4}$ per cent. in the bank rate of exchange costs the company over £100 extra per month. This, of course, does not tend to ease the position.

* * * *

Ventilation at the Van Ryn Deep and State Mines.

The increased attention now being devoted to the subject of ventilation was reflected in several references to it from the Chair at meetings of the Barnato group. At the Van Ryn Deep, Mr. Munro announced that with the increase in the area of the mine workings, the ventilation arrangements, which were quite adequate and satisfactory in past years, have now become insufficient, and it has been decided to instal a large fan at the east shaft, which will double the volume of air passing through the mine. At the State Mines meeting the Chairman, Mr. Munro, mentioned that it was contemplated sinking a central circular shaft that would meet all the ventilation needs of the mine during its existence. It is noteworthy that the shaft will be of circular shape, thus conforming to the most recent Rand practice in respect of ventilation shafts.

* * * *

Ten Years of a Great Mine.

What one successful gold mine means to the whole country was strikingly exemplified at the Modder B. meeting by the Chairman, Mr. J. R. Leisk, C.M.G. He showed that the first decade of the company's milling operations was completed on December 31 last. During the ten years, profits aggregating £5,900,000 were made. Of these profits rather more than four and a quarter millions were paid in dividends to shareholders; in other words, during the first decade of its existence the company repaid its nominal issued capital more than six times over. On the other hand, during the same period of ten years, £5,893,000 have been spent upon development, equipment and general mining operations, of which by far the greater portion was distributed in this country. Further, an analysis of the accounts revealed that over the said period no less a sum than £806,000 was paid by way of direct taxation of profits. "These figures illustrate in the clearest possible manner what an important factor a well-established gold mine is in the economic life of South Africa, and they also indicate the extent to which the industry contributes to the general welfare and prosperity of the community."

* * * *

The Life of the New Kleinfontein.

At the New Kleinfontein meeting, Sir Wm. Dalrymple boldly tackled the thorny question of the life of the mine, upon which shareholders are so fond of seeking enlightenment. "I have been asked to give my idea as to the extent of the remaining life of the undertaking," said Sir William. "The Apex Mine, on which we relied for a substantial extension to the profitable life of the company, has proved a failure. Had we been able to maintain pre-War working costs of 17s. to 18s. per ton, it is probable that the life of the company would have been considerably extended, but a working cost of 28s. 5d. per ton, being more than the revenue per ton to be expected from the ore, rendered this expectation hopeless, and consequently the mine had to shut down in April, 1920. We are therefore thrown back on the resources of the old mine, together with a few patches in the Benoni and Chimes West area. We are extracting ore of the best grade we can expect in view of the tonnage to be handled, but the time is gradually coming when we must endeavour to work at a profit with a declining tonnage and a lower grade. The life of the venture at the best is a matter of a few years, and this may be curtailed or slightly increased in accordance with variations in working costs and fluctuations in the price which is obtained for our gold."

The Falcon's Outlook.

Speaking at the Falcon meeting in mail week, the Chairman, Mr. J. C. Prinsep, said, inter alia: For the first six months of the current financial year the estimated value of the output was less than the cost of obtaining it. This position may be somewhat improved because we may realise the output at somewhat better prices than we have estimated. Even with the economies which are being effected I see no reason to anticipate that the result of the current financial year will be little if anything better than that the cost of the output will be met by the proceeds of the sale of the output unless copper improves in value.

* * * *

The Year with the Central Mining.

The annual report of the directors of the Central Mining and Investment Corporation for the year ended December 31, 1920, is a most encouraging document in these bad times. It shows a profit of £390,283. A final dividend of 6s. per share free of income tax has been declared, £100,000 has been carried to reserve, and £10,396 carried forward. The profits earned, says the report, and the dividends declared by the South African gold mining companies in respect of the past year were eminently satisfactory. Part of the Company's holding in diamond shares has been sold at high prices and not yet replaced. On the other hand, the Corporation is interested in the Diamond Syndicate, which at present holds a considerable stock of diamonds. The Syndicate's agreement with producers has in the recent trade depresion exercised a steadying effect on prices, and will in due course greatly facilitate a return to normal conditions. The company is in such a sound position that the directors declare that the effects of the present adverse conditions are likely to be speedily overcome, once industrial peace is restored

* * * *

Opening of the Slyhoek Mine.

A new gold mining venture in the Machadodorp section of the Barberton mining area, known as the Slyhoek Mines, Ltd., and managed by Mr. T. Angus, formerly manager of the Barrett's Berlin Mine, Kaapsche Hoop, was formally opened recently. Mr. John Spiers was present representing the owners, and among the guests were the Mayor of Machadodorp (Mr. Smallman), Mr. J. T. Audas, Mining Commissioner for Barberton, and Mr. de Clerck, the discoverer of the reef. The mine has been under development for three years, and about 10,000 tons of ore are at grass ready for crushing. A 20-stamp mill has been installed, driven by water power. The race for the supply of water power is about two miles long, and passes through a tunnel 825 ft. long. The ore is mined from a flat reef outcropping in the hill about 500 feet above the mill. Interesting speeches were made at the opening ceremony, wishing the new venture every success.

* * * *

A New Pretoria Coal Proposition.

The gentlemen concerned with the discovery of coal, 30 miles east of Pretoria, and beyond the Premier Mine, have been busy in Pretoria during the last few days to organise their business here. They propose, if things go satisfactorily, to deliver supplies of coal to Pretoria householders within little more than a month from date. The shafts have been sunk through the thirteen foot seam at 120 feet, and have exposed a household coal of very high quality, which is now being daily used at the works for the hauling engine. The property is a large one, the coal practically inexhaustible, as the dip of the seam approaches nearer the perpendicular than anything else, and water for working purposes is in full abundance, whilst the train passes at the side of the mine. We are led to believe that this proposition is to be placed before the public of Pretoria within the next few weeks. In addition to the above, another independent coal supply is on the eve of delivering coal and fuel in Pretoria in any quantity required, at two-thirds of the prices at present ruling. This is the statement of the promoters and one has no reason to doubt it.—"Pretoria News."

Busy Man's Page.

FORTHCOMING MEETINGS.

A Company Diary.

Transvaal Consolidated Land and Exploration Co.—26th ordinary general; Corner House; June 15.

Mining and Metallurgy.

The Far Eastern Rand. By R. R. Mabson, *Stock Exchange Gazette*, May 5, p. 908.

Iron and Steel.

The Welding of Steel.—Iron and Coal Trades Review, May 6, p. 621.

The Cleaning of Blast Furnace Gas.—Iron and Coal Trades Review, May 6, p. 625.

The Protection of Iron with Paint.—Iron and Coal Trades Review, May 6, p. 628.

Steel Rails from Sink Head and Ordinary Rail Ingots.—Iron and Coal Trades Review, May 6, p. 642.

Engineering.

Measure Compressed Air Consumption in Pneumatic Tools.—Colliery Guardian, May 6, p. 1315.

The Scientific Control of Combustion.—Colliery Guardian, May 6, p. 1316.

Electrification of a Diamond-Cutting Factory.—Electrical Review, May 6, p. 589.

The Use of X-rays for Testing Materials.—Electrical Review, May 6, p. 602.

Gas Producer Practice.—Iron and Coal Trades Review, May 6, p. 636.

Surface Electrical Equipment. Iron and Coal Trades Review, May 6, p. 641.

Economics.

The World's Supply of Metals and Minerals. Bulletin of the Imperial Institute, No. 4, p. 546.

British Miners Jeopardising Coal Trade of Great Britain.—Coal Trades Journal, April 27, p. 468.

Industrial Trucks Solve Coal Storage.—Coal Trades Journal, April 27, p. 487.

The Stoppage of the Coal Mines.—Colliery Guardian, May 6, p. 1319.

A Tribute to Jackhammers.

A notable tribute to Jack Hammers was paid by Mr. E. G. Izod, the Chairman of the Village Deep, at the annual meeting of that company. "We are gradually," he said, "replacing reciprocating machines in the mine by Jack Hammers, and hope by reducing the stoping width to increase our grade and efficiency. What is, however, of equal importance is that with the smaller holes drilled by Jack Hammers we are able to use a lighter charge of explosives, and the hanging wall should not, therefore, be so badly shaken as would be the case if we continued with the large 2¾ machines. It is very necessary to take precautions such as this when mining great depths, and the results from the more extended use of Jack Hammers should be safer and cleaner mining."

Before the regular business of the New Kleinfontein meeting was proceeded with, the other day, Mr. G. C. Fitzpatrick, in a felicitous speech, proposed, on behalf of the shareholders, a hearty vote of congratulation or the honour of the knighthood which had been conferred on the chairman of the company, Sir William Dalrymple. The chairman thanked Mr. Fitzpatrick and the shareholders for their expression of goodwill. He had, he said, merely tried to do his duty during the most difficult time the British Empire and South Africa had ever experienced, and in the appreciation on the part of those whom he had attempted to help, he was more than repaid. He trusted that all present would continue to do their best for South Africa, as in doing what we believed was best for South Africa, we were doing what was best in the interests of the great British connection.

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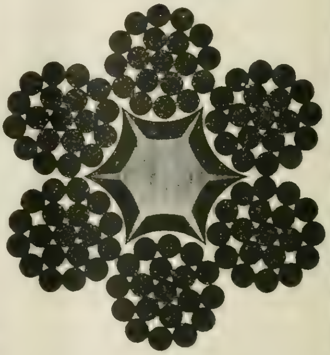

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The Week in the Sharemarket.

STEADY BUT QUIET—GOLD PREMIUM FLUCTUATES—COAL SHARES HIGHER—DE BEERS DEBENTURES?

Gold has fluctuated during the week, touching 106s. on Monday, according to latest cables and falling to 105s. 9d. on the following day. The market for gold shares has, as a consequence, been firmer, though it is still, on the whole, quiet. Events on the other side are still too unsettled to permit of any interest in gold mining shares, and the fact that we are now engaged in the always difficult task of trying to bring down wages on the gold mines does not make for market activity. Until something definite in the way of cheaper working arises out of the present discussion we can not expect much interest to be taken in the Rand, even though the dividends to be announced next week show little falling off when compared with those for the corresponding period of last year. Coal shares are naturally firmer on the prolongation of the British strike, and quotations are higher for our colliery shares without, however, many changing hands. People seem to prefer to float their own coal mining companies to buying shares in those of others. The new Union 6 p.c. loan has not been too warmly welcomed at this juncture; it will be issued simultaneously in London apparently, and may go better there. The much-discussed De Beers debenture issue turns out to be nothing more than an issue of £1,000,000 debentures by its subsidiary, the Cape Explosives, Ltd. The latter company has recently erected the second largest fertilizer plant in the world. The main building occupies an area 700 x 100 feet. The firm has been manufacturing explosives for some time and is now turning its attention to glauber salts, sheep dip, arsenate of lead, etc. Cables from London dated the end of last week state that the Stock Exchange during that week was extremely quiet, apart from the steady demand for high-class securities, which was stimulated by the expectation of a reinvestment of a portion of the £50,000,000 of dividend money next week. The rise in the price of gold, together with the proposed reduction of the Rand miners' wages to correspond with the recent fall in the cost of living, caused a moderate revival of Kaffirs, which later went easier on Paris realisations arising from some over-speculation on the Bourse. Diamonds were weak under the pressure of sales from Paris, while a growing belief that the usual end of June dividend of De Beers would be passed was a contributory factor. Rhodesians were lethargic, although Chartereds were steady. There was some inquiry for Tanganyika on the improved outlook for copper. The volume of business done in tin shares compared favourably with that done in other directions. It is claimed that the operating costs of the producing companies are now below the equivalent of £180 per ton metallic tin.

	Frid. 27th.	Sat. 28th.	Mon.	Wed. 1st.	Thrs. 2nd.
Anglo-American Corp.... ...	19 0*	19 3*	19 0*	19 3*	18 6*
Apex Mines	7 6*	7 3*	7 3*	7 6*	7 6*
Bantjes Consolidateds . .	5 4*	5 4½	5 8*	5 6*	5 6*
Brakpan Mines	54 0†	—	—	55 0†	54 0†
Breyten Collieries	5 0*	—	—	5 0*	5 0*
Brick and Potteries	4 0*	4 0*	4 0*	4 0*	4 0*
Bushveld Tins	0 9	0 9*	0 10	0 9*	0 10*
City Deeps	—	43 0*	43 6	—	—
Clydesdale Collieries...	28 6†	27 0*	27 6*	—	29 0*
Consolidated Diamonds	12 9	13 0*	12 3*	12 6*	12 6*
Consolidated Main Reefs ...	10 7*	10 6*	10 6*	10 7*	10 7*
Consolidated Mines Selection	—	—	—	—	13 0*
Coronation Freeholds...	0 6*	—	0 10*	0 10*	0 10*
Coronation Syndicates ...	—	4 0*	4 0*	—	—
Crown Diamonds	2 8*	2 8*	2 9	2 9*	2 9
Crown Mines	—	—	41 0†	40 6	40 6*
Daggafontein Mines...	2 3*	2 4	2 4*	2 3*	2 3*
East Rand Coals...	2 3*	2 4	2 4*	2 3*	2 3*
East Rand Deeps	—	0 6*	0 6b	—	—
East Rand Proprietary...	4 3*	4 6*	4 9*	4 9b	4 9*
East Rand Debentures	£66½*	£67*	£67*	£70	£68*
Eastern Golds	0 6*	0 6*	0 6*	—	—
Ferreira Deeps	—	—	—	10 0†	—
Frank Smith Diamonds ...	3 0*	3 0*	3 0*	3 0*	3 0*
Geduld Proprietary...	51 9	52 9b	52 3	52 6	52 6
Glencoe Collieries	13 7*	—	—	13 9*	13 9*
Glynn's Lydenburgs	10 0†	—	10 0†	—	—
Government Areas	81 0†	81 0	81 0*	82 0*	82 0*
Hume Pipes	—	19 0*	—	—	—
Jupiters	3 9*	3 9*	3 9*	3 9*	3 9*
Knight Centrals	4 1*	4 1*	4 0*	4 1*	4 0*
Knights Deeps	15 0*	15 0*	15 0*	—	—
Lace Proprietary...	—	8 0*	7 9*	8 0†	7 0*
Leeuwpoort Tins	10 9	10 9	10 6*	11 0†	10 6*
Lydenburg Farms	4 10	4 10*	4 10*	5 0	5 3
Meyer and Charltons	—	80 0*	81 0*	81 0*	—
Modder B.'s	25 6	25 9	25 9	26 0	26 3
Modder Deeps	44 10½	45 0*	45 0	45 0	45 0
Modder Easts	10 4½	10 3*	10 4½	10 6	10 9
Natal Navigation Colls. ...	37 0	—	37 3	—	—
New Era Consolidated... ...	6 9	—	6 9	6 6*	6 6*
New Geduld Deeps	1 3*	—	1 3*	1 4*	1 3*
New Kleinfonteins	5 6*	5 9	6 6	5 10*	5 9
New Modderfonteins .. .	66 0	66 6	66 9	67 6	68 0b
Nigels	4 0*	4 0*	4 0*	—	4 0*
Nourse Mines	6 6*	6 6*	7 0*	6 9*	7 0*
New States	22 6*	23 0	23 0*	23 3*	23 0
Pretoria Cements	50 6*	50 9*	52 6a	53 0	52 6*
Princess Estates	—	—	1 0†	2	1 0*
Rouxvilles	1 9	1 8*	1 9	1 6*	1 6*
Rand Collieries	—	—	1 0*	—	—
Rand Nucleus	1 0*	1 0*	1 0*	1 0*	1 0*
Randfontein Centrals...	9 3*	9 3*	9 3*	9 3*	9 3*
Randfontein Estates	13 6*	13 7*	13 7½	13 7*	13 6*
Roberts Victors	6 6*	6 6*	6 6*	—	—
Rooibergs	5 3	5 0*	5 1*	5 0*	5 0*
South African Lands	4 6*	4 5*	4 6*	4 0*	—
Springs Mines	34 9	35 4½	35 3	35 3*	35 9a
Sub Nigels	12 0	11 9*	12 1½	12 0*	12 1*
Swaziland Tins ..., ...	5 6*	6 0*	6 6*	6 0*	6 0*
South Van Ryns	2 9*	2 11*	2 10*	2 9*	2 9*
South African Townships ...	10 6*	10 0*	10 9	10 9	11 0
South African Alkali	21 9	22 6	22 0	21 3*	21 0
Do. Options	6 0*	—	—	—	—
Transvaal Silvers	28 3*	29 0	30 3	31 4¼	31 9
Tweefontein Collieries	20 0†	17 0*	17 0*	20 0†	17 0*
Transvaal Con. Lands	18 0*	18 0*	19 0†	18 0*	18 0*
Transvaal G.M. Estates ...	7 6*	7 9*	—	—	8 0*
Union 5 per cent.	£97½*	£98	£98	—	£98¼
Van Ryn Deeps	73 6*	73 6*	73 6	73 0*	74 0
Village Deeps	7 3*	7 0*	7 3*	7 0*	7 3*
West Rand Consolidated ...	3 0*	—	—	—	—
Western Rand Estates	3 4*	3 4*	3 3	3 3*	3 5*
Witbank Collieries	45 0*	45 0*	45 0*	45 0*	46 3*
Witwatersrands	—	13 0†	11 0*	—	12 0*
Wit. Deeps	6 6*	6 6*	7 0	6 9*	7 0*
Wolhuters	—	3 3	3 4*	3 5*	3 4*
West Springs	11 10¼	11 9*	11 9*	12 0*	12 4*
Zaaiplaats' Tins	3 9	3 7	3 3	3 6	3 4*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

The list of certificates, issued by the Mines Department for the period ending 28th May, 1921, is as follows:—Mine overseers (metalliferous mines): J. Bosman, G. Chrystal, T. Little, R. Tellam, R. R. Vail, J. E. van der Merwe, J. H. Venter. Collieries: H. Beeston, G. Swan. Assayers: J. Barker, E. E. Evans, W. B. Lamb, H. Rusden.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

MORE CHEERFUL TENDENCY, BUT SLOW GOING PREDICTED FOR NEXT TWELVE MONTHS—FINANCIAL—IRON AND STEEL—AGRICULTURAL IMPLEMENTS—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—ADVANCES TO WOOL FARMERS—COAL IMPORTS INTO BRITAIN AND WAGE REDUCTIONS—OIL FUEL—SOUTH AFRICAN ALKALI, LTD.—METAL MARKET.

General Position.

Business has again been very quiet this week and restricted to very narrow limits. The Commercial Exchange has so far shown no improvement, but a little more activity is looked for in the opening days of the present month. June, however, owing to stocktaking on the mines, and the natural desire to curtail purchases as much as possible, is not expected to be a very lively month. Among mining material merchants prospects are brighter, the tendency from a financial and business point of view being all towards improvement, and with the premium on gold on the upward grade (at the time of writing it is about 105s. per oz.), and the prospects encouraging of a reduction in wages on the mines, the position generally is better. Inquiries for material and prices are becoming more frequent; steel plates, which have been stagnant for a long time, are now again in demand. The tendency, however, as regards prices, especially for heavies, is still downward, but this decline will, it is thought, eventually tend towards stabilising the market. In this connection it will be of interest to record the views of a leading merchant, whose opinions are much valued, as to present conditions and probable trend of trade during the next twelve months. Being in a position better than most to feel the pulse of commercial activities and gauge probable movements throughout the world—and up to the present his views as to commercial and financial developments have been singularly justified by events—his opinions carry weight. He said things were still pretty bad and competition very keen; prices are falling and merchants are practically importing nothing at all. It appeared to him as if the coal strike were soon going to be settled, which would, of course, create more confidence here and give an impetus to trading. With regard to the proposed reduction of wages on the mines, it appeared to him as if the Unions were going to accept a reduction, and that in itself would improve matters here to some extent. Of course, the position of mines like the East Rand Proprietary Mine and other low-grade mines was still creating grave concern in mercantile circle, making all merchants nervous about importations and as to what the future is going to be here, and it was impossible to foresee what effect that would have yet. The general opinion, he stated, was that we were going to experience at least another twelve months of bad times. The actual position now, as far as one can gauge it here, is that outside the gold mining industry the agricultural industry is the mainstay of the country, and one must not forget the situation which was created during the very inflated price period, when farmers obtained for their stocks of wool and skins advances far in excess of what these were going to realise. Some of these stocks have been realised, but a considerable quantity remains unrealised. Now the position has arisen where the farmer has become indebted to his agent, whoever he may be, or his bank, for a commission considerably in excess of what his products are going to realise, and therefore has practically mortgaged the whole of this coming year's crops, which it will take him some considerable time to repay. Then again the price of mealies having dropped, the farmer is not going to get such a big return this year as last for the maize he produces, and in consequence will be unable to purchase anything. Until, therefore, that debt has been liquidated and the farmer has had time to start afresh it is impossible to expect any radical improvement here. But as soon as equilibrium has been restored the spending power of the agricultural industry, which is very large indeed, will help things very materially. There may, he said, be temporary spurts due to non-importation of material now, which in due course is bound to cause a shortage, of which some people will probably take advantage in regard to prices, but he did not think that that was going to afford very much relief to anybody. To-day practically everything is being sold at below cost, and in many instances below cost of replacement. In conclusion he thought the Chamber of Mines should if at all practicable force reductions in wages in advance of the fall, which sooner or later must inevitably occur, in the premium on gold.

Financial.

The prospectus of the Union's new issue of 6 per cent. local registered stock, 1927-32, has been published. The loan is to be utilised for the purpose of railway and harbour and other public works in the Union; the issue price is £100 per cent., interest being payable half-yearly on February 1 and August 1. The principal is repayable at par on February 1, 1932, but the Union Government retains the right to redeem the stock at par on or after February 1, 1927, on six months' notice. The subscription lists were opened on June 1. Subscriptions must be for not less than £5, and may be for multiples of £1 in excess of that amount. The first payment of interest will be made on February 1, 1922. Union of South Africa 5 per cent. local registered stock, 1921-36 (tax free) will be accepted as the equivalent of cash to the amount of its face value for the purpose of subscribing

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to this issue. Union Treasury Bills will also be accepted in like manner, but only at the offices from which they were originally issued, or at the Treasury, Pretoria. A commission of ½ per cent. will be allowed to all recognised stockbrokers, banks and other financial agents on allotments made in respect of applications, but no commission will be allowed in respect of Treasury Bills or Union of South Africa 5 per cent. local registered stock, 1921-36 converted into this stock.

South African Reserve Bank.

Now that the prospectus of the South African Reserve Bank has been before the public for some time, it may be of interest to define the objects of the bank and the desirability of the stock from an investor's point of view. The object in starting the bank is that South Africa should have a " central " bank in order to stabilise credit and protect the country's reserve of gold and generally to perform the same functions in South Africa as the great "central" banks of Europe and America. That " central " banks have conferred great benefits in other parts of the globe is unquestionable, and with careful and cautious management the South African Reserve Bank should bring similar advantages to this country. As regards the investor's point of view, the Bank will shortly have the sole right to issue notes in the Union of South Africa, will hold the reserves which under the Act of 1920 all the other banks in the country must deposit with it, and will have its own capital of £1,000,000. The combined total of funds which it will thus command, many times over its own capital, will be entirely free of interest. Under the Act the Bank is obliged to hold in gold 40 per cent. of its note issue and deposits, enabling it, therefore, to loan out the remaining 60 per cent., secured by first-class bills of exchange, by the endorsement of another bank, and short-dated Government issues.

The Metropolitan Board of Works, Victoria has issued at 99 a 6½ per cent. loan of £1,140,000 redeemable in 1932. The City of Sydney is issuing a loan of £1,000,000 in 6½ per cent. 10-year debentures at 99 per cent.

Union's Proposed Loan.

Mr. Burton, in the House of Assembly, stated that in this connection he had been in communication with New York as well as other centres, and that the terms offered in New York were so much higher as compared with London that the Union had been obliged to go to London for the money.

Iron and Steel.

Business this week, curtailed by the Union Day holiday, has been rather quiet and very little has been done apart from the usual end-and-beginning-of-the-month purchases by the mines. The opinion prevails, however, in mining circles that we have at long last about touched bottom and are on the eve of gradually improving trade conditions. Latest quotations: Dunswart, 29s.; Union Steel Corporation, Ltd., ordinary sized rounds, flats, and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. 6d. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 55s.; ⅜ in. iron, 40s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s. 6d.; ⅞ in. to 2 in., rounds, 39s. 6d.; larger sizes, 52s. 6d. to 62s. 6d.; ¼ in. square iron, 60s.; ⅜ in., 47s. 6d.; ½ in. to 2 in. square iron, 38s. 6d.; larger sizes, 45s. to 52s. 6d.; square mild steel, ⅝ in., 41s. 6d.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. 6d. to 64s.; channels and joists, 47s. 6d. to 48s. 6d.; imported angles, 45s. 6d. to 47s. 6d.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in., ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in.,

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round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. 6d. to 57s. 6d.; shovels, 60s. to 70s.; wheelbarrows, 70s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d. per 98 lb. coils; 24s. to 25s. per 68 lb. coils; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb.; tin, £20 per ton; lead, £24 10s. per ton.

Messrs. Stewart, Sanders & Co., Ltd., bolt, nut and rivet manufacturers, are now erecting an entirely new bolt plant alongside the works of the Union Steel Corporation at Vereeniging.

A prominent American importer said it was not a question to-day of prices but of buyers. Within the last month there had been a slight revival in orders in Durban, but he did not expect a radical improvement in trade conditions before the end of the year. After that he anticipated heavy competition from all parts of the world, and he did not think that there would be any rise in prices but rather a downward tendency. Generally speaking, stocks could not be replaced at the prices at which they were being sold to-day, but as regards galvanised sheets these were undoubtedly lower and could now be manufactured in America or Britain at a much lower price. The proposed cut in wages on the mines he thought had already been discounted by merchants.

Engineering Shops.

Inquiries are more numerous and there is a feeling that the corner has been turned. The trouble in the meantime is to make up arrears, but for those businesses which weather the storm successfully the past depression will unquestionably be a blessing in disguise, as it will enable them to a certain extent to look upon the present high wages and high profits in a different way from what is now being done, and to go back to the proper method and recognise costs as well as profits, the same as labour. A prominent engineer was of opinion that labour could without loss of dignity accept a lesser wage and he was convinced that representatives from whichever side at the recent and forthcoming conferences were convinced that wages have got to drop and that nothing would hinder it; there might, he thought, be some kicks against it, but these would only be formal.

Agricultural Implements.

The present is a time of crisis for all tractors. The Government has instituted at Pretoria trials of different kinds of tractors—thirteen different types are now being tried, and all prospective buyers are anxiously awaiting the results. Foreign firms are spending a lot of money in this connection, but up to the present it is not known whether any of these tractors are suitable for the conditions obtaining here, and it will take a few months' experience to ascertain whether they come up to our local standard. As regards the agricultural implement industry, prospects of increasing activity are improving; the financial position at present is holding many buyers back, but there are slight indications of business opening up again.

Timber and Building Materials.

Business is still rather dull in the absence of any great building activity at the present time; prices generally are inclined to go easier; stocks of timber on hand and arriving are plentiful. 3 x 9 deals are 1s. 5d.; scantlings, 1s. 4½d. to 1s. 5d.; beaver board, 5d.; oregon, 9s.; pitch pine, 9s. 6d. to 10s. 6d.; floorings, 8¾d. to 9d.; ceilings, 6d. to 6¼d.; corrugated iron, 24 gauge, 10d. to 1s. Furniture timber: Japanese oak, 1 in. to 2 in., 1s. 8d. to 1s. 9d. per sq. ft.; Burmah teak, 20s. to 21s.; American oak, 1 in. to 3 in., 1s. 6d. per super; American black walnut, 1 in. to 4 in., 1s. 7d. to 1s. 8d. per super; West African mahogany, 1 in. upwards, 2s. 1d. to 2s. 3d. per super; 3-ply ash, 5 m.m., 10d. per super. Bricks are ruling at 70s. for stock; 60s. for mixed; £4 10s. £5 for wire cuts; and £5 for pressed per 1,000 at yard; white lime, 7s.; unslaked, 10s. 6d.; blue lime, 4s. 6d.; blue plaster lime, 5s. 6d.; cement, 11s. 6d. a bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 47s.; 3-ply, 55s. 3d. The supply of building operatives is at present over-abundant.

London builders are being asked to accept reductions of 3d. per hour for the skilled men and 5d. per hour for labourers, and those in close touch with the trade believe that those cuts will eventually be accepted by the workmen.

Second-hand Iron and Timber Yards.

Business is only middling. Stocks are now fairly abundant; iron is selling at 6d. to 8d.; timber at 1s. to 1s. 1d.; casements from 9s. to 25s.; doors, new, 35s. and upwards;

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mouldings, from 2½d.; One large firm has for disposal 1,000,000 bricks, much below ruling rates, ready for transport, and some 50 to 75 tons of angle iron in all sizes and lengths; Kafir pots; skylights, assorted sizes, etc.

Electrical Goods.

Owing to the insufficiency of current and the inactivity in the building trade at present, business is rather slow in town and along the Reef, and not so many orders are now coming in from other parts of the Union. There is no change to report in prices, but the tendency this week is for them to come down, as the latest quotations from Britain are coming in easier, tubing especially so. Material is arriving regularly from Britain, but none at all from the Continent, owing to the 26 per cent. customs levy recently imposed, whose vagaries are not yet rightly understood on either side of the water. The recent reduction in freights will help to cheapen electrical goods later on. At present all lines are well stocked here.

Advances to Wool Farmers.

Before his departure for London the Prime Minister stated that the Government had completed a scheme whereby cash advances may be obtained by owners of mohair and wool grown within the Union and deposited in warehouses at Capetown, Port Elizabeth, East London and Durban. These advances amount, according to quality, to a maximum of 6d. per lb. for summer firsts, and up to 4d. per lb. for winter firsts. These advances, representing 50 per cent. on the average pre-War prices for the former class and about 40 per cent. for the latter, will only be granted on wool shorn subsequent to August 1, 1920. Government agents will be appointed at each of the ports to receive, value and store all wool and mohair under the scheme. Warrants will then be sent to owners entitling them to the advance specified therein. Interest on such advances is payable at 6½ per cent., the Government guaranteeing the banks against any loss of principal but not of interest. Government agents' charges in connection with the handling, valuing and insurance of the produce to be paid by owners of same. The scheme is purely a temporary measure to meet the present dislocation of the European markets, and it is not proposed to continue it for a period of more than twelve months, and should enable the farmers to tide over the period of depression and financial stringency in which they are at present. General Smuts stated that he had impressed on the banks the grave necessity of doing everything in their power not to contract credit too much, especially as regards the producer section of the community, and he was satisfied that the banks would continue to do their best in this respect. But from the nature of our resources and industries he was assured that so far as South Africa is concerned the present depression is only a temporary one, and with this assistance the farming community could now face the immediate future hopefully.

Coal Strike.

The Glasgow dock strike, which commenced on April 22, has collapsed, the men having now resumed work. During the past week or so large shipments of German, American and Belgian coal, amounting to 25,000 tons, have arrived in Britain and no difficulty has attended its unloading. This coal is being sold at £5 per ton, plus cartage from the docks.

600 miners at the Madeley Wood Collieries, Shropshire, have accepted a temporary wages agreement pending a general settlement and resumed work.

Wage Reductions.

Wage reductions in many departments of industry in Britain are taking place without strikes or Government interference, in the anticipation that the cost of living will drop. During the first quarter of the present year nearly three million workers engaged in different industries have accepted reductions, including railway, iron and steel workers, etc. In the shipbuilding and engineering trades, which affect some million and a half workers, expectations of satisfactory negotiations are held with regard to immediate reductions in wages.

Oil Fuel.

The Civil Lord of the Admiralty, in the House of Commons during the week, emphasised the superiority of oil fuel as compared with coal. He stated that the Fleet would soon consist entirely of oil-burning ships. The main

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Admiralty oil reserve it was proposed to establish in Britain, with installations around the coast. Plans are being prepared for the establishment of special stations at the Cape, the Falkland Islands, Gibraltar, Hong Kong, Port Said, and other places.

The Under Secretary for Foreign Affairs has stated in the House of Commons that the Anglo-Persian agreement has definitely lapsed.

South African Alkali, Ltd.

The demonstration of the completed plant which was given on Friday last week was a very big success. The plant is now in full operation and is producing practically pure dry carbonate of soda. The borehole liquor available is of absolute purity, being entirely composed of pure carbonate of soda, pure salt and water. There is a world's market for the product, and no difficulty is anticipated in disposing of all the soda the company can produce. Salt of 99 per cent. purity has been produced at the company's laboratory, and the erection of a plant is contemplated for producing salt of this very high quality. The board are satisfied that the sales from production of salt should pay the running costs of the whole salt and soda plant. The directors extend an invitation to all interested parties to visit the property and inspect this latest local industrial concern in full swing.

Namaqualand Copper Co.

At the meeting of this company held in London last week the chairman said there was no reason to suppose that the limit of the ore bodies had been reached. But there was no chance of starting on the old lines, and the company had come to the conclusion that the only course was to erect a Bessemer plant on the ground.

Cape Portland Cement Co.

The issue of shares recently offered for public subscription by this company has already been taken up in full.

Drop in Freights.

As illustrating the great decline which has occurred in freights, an instance is reported from London, where recently a British steamer was chartered for twelve months at 6s. per ton per month, compared with 30s. ruling in the early part of last year.

Power Alcohol from Rice and Straw.

A process has been patented in Britain and elsewhere for making power alcohol from rice and straw; the result of the experiments hitherto conducted in this direction has, it is announced, been satisfactory.

Metal Market.

Latest quotations: Standard copper, £73 18s. 9d. cash and £73 18s. 9d. forward; electrolytic copper, £76 cash and £77 forward; Straits tin, £177 15s. cash and £178 15s. forward; English lead, £23 cash and forward; bar silver, 33⅞d. per oz.; and fine gold, 105s. 1d.

NORTHERN RHODESIA: MONTH'S OUTPUT.

From the Secretary for Mines, Northern Rhodesia, we have received a return of mineral productions for the month of March, which shows the following results:—

Gold.—J. A. Cowie (Jessie D.B. Mine, 143.94 oz., value £604 10s. 6d.; S. Broomfield (G. D. Crossley), 37.81 oz., value £158 15s. 4d.; total gold in month, 181.75 oz., value £2,333 10s.

Silver.—J. A. Cowie (Jessie D.B. Mine), 24.34 oz.; value £1 15s. 7d.; S. Broomfield (G. D. Crossley), 5.53 oz., value 10s. 4d.; total in month, 25.87 oz.; value £2 5s. 11d.; total silver in year, 72.43 oz.; value £7 6s. 7d.

Lead.—Rhodesia Broken Hill Dev. Co., Ltd.: Total in month, 1,845.01 tons, value £27,996 1s. 4d.; total lead in year, 4,822 oz., value £72,715 15s. 2d.

Vanadium.—Rhodesia Broken Hill Dev. Co., Ltd.: Total in month, 56.16 tons, value £2,237 10s.; from 1st January, 5.60 tons, value £163 11s. 3d.; total in year, 61.76 tons; value £2,401 1s. 3d.

Zinc.—Rhodesia Broken Hill Dev. Co., Ltd.: Total in month, 11.10 tons; value £436 10s. 7d.; total zinc in year, 12.30 tons; value £494 14s. 5d.

Summary of production to date.—Gold, £48,808; silver, £4,495; lead, £897,959; copper concentrates, £220,959; copper (finished), £349,137; bismuth, £3,491; zinc ore, £85,071; mica, £412; vanadium ore, £2,401.

Total value from commencement, £1,612,352.

March value, £31,435; March, 1920, £18,132.

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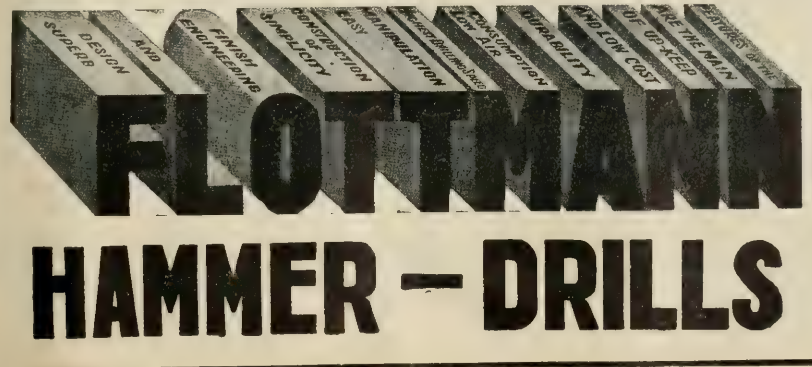

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The "Mining Journal's" Essay Competition.

The enduring improvement which our mines require can only be obtained through the media of better efficiency and lower working costs and with a view to eliciting constructive views on these supremely vital subjects the *South African Mining and Engineering Journal* offers a prize of £25 for the best essay on the subject of "How to Improve Efficiency and Lower Working Costs in and on the Mines of the Witwatersrand."

Criticism should be constructive rather than destructive, but the assurance is given that no competitor will in any way be prejudiced in his employment by the submission of criticism of existing means or methods.

Essays containing libellous or malicious statements against any particular individual or individuals will not be considered.

TERMS OF THE COMPETITION.

The conditions of this competition are as under:

1. Essays must not exceed 2,500 words in length, and where new or suggested devices form an essential portion of the Essay, the contribution should be accompanied by diagrams clearly exhibiting the nature and functions of such device or devices.
2. Essays should be typewritten or written in easily legible handwriting on one side of the paper (preferably of foolscap size) only.
3. Each essay must state the full name and address of the author and if the author is an employee of a Mining Company operating in South Africa or has been an employee of such a company, his occupation and position should be stated.
4. Essays and diagrams (if any) must be addressed to the Editor, the *S.A. Mining and Engineering Journal*, Box 963, Johannesburg, and be marked "Competition" in the top left-hand corner of the containing envelope.
5. The competition closes on July 1st, 1921.
6. In the event of the Committee of Adjudication deciding that no essay submitted merits the award of £25, the Committee will have power to withhold the award of such a prize and to give in lieu thereof an amount which they consider proportionate to the value of the best article or articles submitted.
7. It shall be at the option of the Editor of the *S.A. Mining and Engineering Journal* to publish any essay or any portion of any essay submitted and to pay for such essay or portion thereof at the rate of £2 2s. per page according to the measure of pages in the *S.A. Mining and Engineering Journal*.
8. No correspondence can be entered into regarding this competition, and the Editor of the *S.A. Mining and Engineering Journal* will not hold himself responsible for the safe return of any manuscript submitted, but where a stamped and addressed envelope is forwarded with each contribution the Editor will, after adjudication, endeavour to return unsuccessful contributions.
9. A competitor may submit more than one contribution.
10. It is an express condition accepted by and binding upon all competitors that the decision of the Committee of Adjudication as constituted above or of any alternative adjudicators is final and absolute. Submission of manuscript will infer a full understanding of the acquiescence of the competitor in this and other conditions of the competition.
11. Essays may be written in either of the official languages.

Points for Competitors.

There are one or two matters in connection with this essay competition which we would like to bring to the notice of competitors.

In the first place it should be made clear that a good idea will not be debarred from winning the prize offered because the contribution fails from a literary point of view. Neither will brevity be a handicap. On the contrary we shall welcome briefly expressed ideas and suggestions provided that they contain some useful and new idea or some better application of an idea or device which is not new or novel

A committee of well-known engineers connected with the mining industry has been appointed to adjudicate in conjunction with the Editor of this paper.

An E.R.P.M. Accident.

The secretaries write: The following cable has been despatched to-day to our London office: "Main crank shaft of rock hoisting engine at Farrar shaft, Driefontein section, completely fractured Monday afternoon. Hoisting will probably not be re-started in less than 14 days, period of delay depending upon securing locally suitable shaft. Should delay not exceed 14 days, probable loss of tonnage for month of June will be from 10,000 to 15,000 tons."

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The Week's Meetings.

CENTRAL MINING/RAND MINES GROUP.

Crown Mines Meeting.

Speaking at the annual meeting of Crown Mines, Ltd., on May 26, Mr. S. Evans, the chairman, said: The results of last year's operations are very fully described in the reports of the consulting engineer and the general manager, which have been in your possession for some weeks. You will observe that the working profit amounted to £1.093,335 18s. 1d., or 9s. 11d. per ton milled, including £926,062 1s. 7d., or 8s. 5d. per ton milled, derived from the premium on the sale of gold. Compared with 1919 there was an increase of 238,432 in the tons mined, of 32,302 fine ounces in the total yield, and of £352.540 in the amount distributed as dividends. The working profit and the dividends distributed were larger than in any previous year since 1915. Our gross revenue last year amounted to £3.864,652 19s. 11d., which constitutes a record, and was derived from the following sources:—

Gold: 671.605 fine ozs. at £4.24773 per fine oz.	£2.852.796	14	2
Net premium on sale of gold adjusted to 27/8/20	926.062	1	7
Total receipts from gold	£3,778,858	15	9
Silver: 69.207.42 fine ozs. at 5s 1.79d. per fine oz.	£17.818	19	3
Other receipts, including adjustment of gold produced in previous years, amount received under Bewaarplaatsen Moneys Application Act, 1917, forfeited dividends, etc.	67.975	4	11
Bringing the total revenue from all sources up to	£3.864.652	19	11
The expenditure for the year was: On account of working costs at the head and London offices, £2.611.137 18 4; other disbursements, including capital expenditure, debenture interest, redemption of debentures, annuity in respect of under-mining rights, realisation charges, fees of directors, auditors, and debenture trustees, donations, etc., £327.743 8s. 7d.; Taxation, £143.301 15s. 3d.; making the total expenses	£3.082.183	2	2
Leaving a balance of	782.469	17	9
Deducting dividends .	728.582	3	0
We have left	£53.887	14	9
Adding the amount unappropriated at the end of 1919	403.464	7	9
There is therefore carried forward to the present year	£457.352	2	6

which is made up of stores and materials, £206.761, shares and interests in co-operative and other concerns £55.398, sundry debtors and payments in advance, £56.445, and net cash, £138.748. You will note that our debenture debt has been reduced to £402.800.

The results for the first four months of this year compare thus with those of the corresponding period of last year:

	January 1 to April 30, 1921.	1920.
Working revenue, total	£1.037.105	£1.109.748
Per ton milled ..	30s. 1.8d.	30s. 4.8d.
Working expenditure, total	£886.965	£830.417
Per ton milled...	25s. 9.4d.	22s. 9d
Working profit, total	£150.140	£279.331
Per ton milled .	4s. 4.4d.	7s. 7.8d.

The comparison is to some extent vitiated owing to the loss of tonnage and profit through the strike of miners which lasted eight days in February this year.

The yield per ton last year was lower than in 1919, but barely 1 per cent. below the grade of 1914 and 1915, when the working profit totalled well over one million pounds per annum. On the other hand, there has been a very great increase in working costs as will be seen from the following comparison:

	Per ton milled. Yield, dwts.	Working Costs. s.	d.	Working Profit. Total. £
1920	6.103	23	8.7	1,093,336
1919	6.574	23	0.6	750,423
1918	6.519	22	9.2	410,642
1917	6.161	19	3.6	673.966
1916	6.129	18	3.5	815.630
1915	6.112	16	1.9	1.146.552
1914	6.191	15	7.2	1.191,628

This table shows clearly that the disquieting feature of recent years is the enormous increase that has taken place in working costs.

Increase in Working Costs.

As compared with 1914 the working costs last year show an increase of 51 per cent. per ton mined, or .52 per cent. per fine ounce, whilst the tonnage mined per European worker shows a decrease of 11.5 per cent. and the tonnage mined per native worker a decrease of 16.4 per cent. Development work is also much more expensive than in the past. Last year it cost 112s. 2d. per foot developed, as compared with 47s. 6d. in July, 1909, and 60s. 3d. in 1913. Although we had in our employ an average of 1,633, or 14 per cent. more natives, and spent £827,079, or 46 per cent., more in 1920 than in 1914, there was a decrease of 115,296 tons, or 5 per cent., in the quantity of ore mined. On the other hand, there was an increase of 9,443, or 31 per cent. in the footage developed and charged to working costs.

The working costs at the mine for March this year and for last year compare as follows with the working costs of 1913, the year immediately preceding the war:

	Per ton milled. 1913. s.	d.	1920. s.	d.	March, 1921. s.	d.
White wages	4	6.3	7	6.0	7	9.8
Coloured wages .	3	6.0	4	0.2	4	0.6
Stores and other costs	8	1.0	12	5.0	12	7.8
Total	16	1.3	23	11.2	24	6.2

Other Tables.

As a matter of fact these figures do not correctly reflect the situation. In the above classification stores and other costs include items of expenditure which should figure under labour, such as holiday and sick leave pay, accident assurance premiums, contributions under the Miners' Phthisis Act, medical bureau examinations, etc., in the case of European employes, and food, hospital costs recruiting and repatriation charges, pass and consular fees, irrecoverable advances, etc., in the case of coloured workers. If we add these charges to white and coloured wages and deduct them from stores and other costs the reconstructed table stands thus:

	Per ton milled. 1913. s.	d.	1920. s.	d.	March, 1921. s.	d.
White employes .	4	8.2	8	8.3	9	0
Coloured employees	4	11.6	5	11.7	6	0
Stores and other costs	6	5.5	9	3.2	9	6.2
Total...	16	1.3	23	11.2	24	6 2

On a percentage basis the costs per ton milled of last year and in March this year show an increase over the 1913 figures of:

	Percentage increase over 1913. Year 1920.	March, 1921.
White employes	85.5	92.2
Coloured employes... ...	20.1	20.8
Stores and other costs	43.5	47.4
Total...	48.1	51.6

Our monthly disbursements on account of labour have been per employe per month:

	European. amount. £	s.	p.c.	Native. amount. s	d	p.c.
1913. average.	£26	6	100	77	8	100
1920. average	£48	16	186	86	1	111

European labour cost the Crown Mines in 1920 £955,804, as against £513,874 in 1913, or an increase of 86 per cent., although a larger tonnage was mined in 1913 than in 1920 the figures being 2.483.622 tons in 1913 and 2.443.372 tons in 1920. Our total expenditure on kafir labour was £657.917 last year and £545.830 in 1913, or an increase of 20.5 per cent. in 1920. The expenditure on account of stores and other costs was in 1913 £703.346 and in 1920 £1.015,368 being an increase of 44.4 per cent. last year.

Comparison with 1913.

As compared with the working costs in 1913 the total working costs last year show an increase of £866.039, or 7s. 9.9d. per ton milled, distributed thus:

	Total.	Per ton milled. s.	d.	Percentage.
European employes . .	£441.930	4	0.1	51.2
Natives	£112.087	1	0.1	12.9
Stores and other costs . . .	£312.022	2	9.7	35.9
Total	£866.039	7	9.9	100.0

Development, suspense and head office expenses are not included in the above.

The figures for March this year show an increase over those of the year 1913 of 8s. 4.9d. per ton milled under the following heads:

	s.	d.
European employes	4	3.8
Native employes	1	0.4
Stores and other costs	3	0.7

Of the total expenditure at the mine in 1913, 29 per cent was on account of Europeans, 31 per cent. for natives, and 40 per cent. for stores and other costs, whilst last year 36 per cent. was allocated to Europeans, 25 per cent. to natives, and 39 per cent. to stores and other costs. Had the expenditure on native labour and stores, etc., increased in the same ratio as the expenditure on Europeans the working costs in March last would have been 30s. 7.7d. per ton milled.

Some Anticipations.

When the Crown Mines was formed in the middle of 1909 it was anticipated that the working costs would be about 15s. 9d. per ton milled. The working expenses of the four producing companies, Crown Reef, Crown Deep, Robinson Central Deep and Langlaagte Deep, which were incorporated in the Crown Mines, averaged at the end of 1908 just under 15s. per ton milled, including development. The amalgamation was expected to result in certain economies, and Mr. Warriner in a report written in March, 1913, showed that the centralised organisation had led to savings under the headings workshops, pumping, sorting and crushing, transport to mills, milling and cyaniding, totalling 1s. 8d per ton milled, and that had it not been for unavoidable additions under other headings the working costs would have been down to about 13s. per ton milled. The twelve months immediately preceding the amalgamation, that is, the second half of 1908 and the first half of 1909, covered a period when the prospects of the Rand mining industry as a whole were very promising; the working costs were lower per ton mined and per ounce of gold produced than has been the case at any time either before or after. The Witwatersrand gold mining companies distributed a larger aggregate sum in dividends in 1909 than in any other year. Unskilled labour was efficient and cheap and up to the requirements of the industry.

Some Conclusions.

With the knowledge acquired in the eleven years that have elapsed since the amalgamation estimates were framed we are justified in concluding:

(1) That, taking the mine as a whole, Mr. Webber's estimate of the yield of gold per ton milled was a conservative one; he over-valued the undeveloped ground north of the dyke belonging to the Robinson Central Deep, Crown Reef, Crown Deep and South Rand; he undervalued the undeveloped ground north of the South Rand dyke in the western section and also the whole of the undeveloped ground north of the dyke, judging, of course, by the limited area so far opened up.

(2) And that the decrease in the probable total profit that is likely to result from the venture, as compared with the original estimate, is attributable, partly to the insufficiency and irregularity of the supply of native labour, but chiefly to an increase in working costs which was not foreseen, and which could not have been foreseen in 1908-09 when the estimates were framed. The increases in working costs that have taken place since 1908-09 are attributable to

- (a) additional burdens imposed by the Government through changes in the laws and in the regulations necessitating a much heavier expenditure on underground supervision by Europeans;
- (b) heavier taxation and increasing railway rates, etc.;
- (c) the reduction in the number of working hours per week first in 1911 and again in 1918;
- (d) greater depth of working;
- (e) increases in the cost of stores, of native labour, and of European labour, due in the latter case not only to higher wages but also to extra payment for overtime, miners' phthisis compensation, holiday leave pay, etc.;
- (f) inadequate and erratic native labour supply, particularly since the employment of natives from north of latitude 22 degrees south was prohibited in 1913; and
- (g) decreased efficiency.

Two Chief Problems.

The conclusion to be drawn from what I have said is this: That the chief problems confronting this industry are the supply of unskilled labour and working costs. Taken as a whole, the grade of ore in our mine is satisfactory, and therefore the amount of our future profits will depend, I might say almost entirely, on the adequacy of our kafir labour force and on the extent to which we can bring down expenses. I am satisfied that we have seen the worst as far as costs are concerned and that it is unlikely that there will be any fresh upward movement of prices. The corner has been turned and the fall in prices and in the cost of living which is taking place should shortly begin to tell on the working costs, but it will only do so to a limited extent unless there is a determined effort on our part to reduce expenditure. There should be a considerable reduction in disbursements on stores as the stocks now on hand are used up.

Cost of White Labour

A reduction in the cost of white labour should follow a reduction in the cost of living. As I have shown, white labour costs per ton milled have increased by 86 per cent. Very substantial increases were made in white wages in February, 1920, at a time when the price of gold had reached 127s. 6d. per fine oz., and it was then understood that the matter would be reconsidered if the cost of living was reduced or if the economic position of the industry altered for the worse. The economic position of the industry has altered for the worse, as the price of gold during the past four months averaged under 104s. per fine oz., or 23s. 6d per fine oz. less than it was when wages were increased. 23s. 6d. per fine ozs. means per annum about £800.000 for the Crown Mines, and about £9.500.000 for all the gold mines of the Transvaal. The cost of living is also coming down, and I think we are justified in looking for a proportionate reduction in white wages and an all-round increase in efficiency.

Encouraging Prospects.

Apart from the high costs and the inefficiency of labour the prospects of the company are encouraging. Our ore reserves totalled at the end of last year 8,131,700 tons, valued at 6.4 dwt. over a stoping width of 62 inches, as compared with 8,451.400 tons, valued at 6.3 dwts. over a stoping width of 63 inches at the end of 1919. During last year we developed 1,820,000 tons having an average value of 6.7 dwts. over 61 inches, as against 1.291.000 tons of ore having an assay value of 6.6 dwts. over 58 inches developed in 1919. The tonnage mined last year out of ore reserves totalled 1,547,200 tons, or 272.200 tons less than the quantity of ore added to the reserves. I may explain that the reduction in the reserves in spite of having developed more ore than mined was due to (1) a reduction of one inch in the stoping width, which accounts for 100.000 tons, and (2) the exclusion from the reserves of certain blocks on the upper levels which were found to be below the pay limit. Development work last year equalled 16.4 feet per thousand tons mined, as compared with 13.3 feet in July, 1909, and 13.6 feet in 1913.

As you will gather from the consulting engineer's report, we are exposing very valuable ore in the lowest levels which have been opened up in the centre of the property. The following table brings up to the end of last month the information contained in Mr. Martin's report in regard to the development south of the South Rand Dyke:—

Reef	Footage on Reef	Width ins.	Value dwts.	Inch dwts.
1919:				
Main Reef Leader . . .	580	23	21.7	499
South Reef ..	330	22	11.6	255
Total . .	910	23	17.9	411
1920				
Main Reef Leader . .	1.470	26	24.6	639
South Reef .	1.290	35	9.0	314
Total . .	2.760	30	16.2	487
1921, January to April inclusive.				
Main Reef Leader .	490	29	26.4	767
South Reef .	330	39	10.0	390
Total . .	820	33	18.7	616
Total: Main Reef Leader	2.540	26	24.3	632
Total: South Reef	1.950	33	9.6	317
Totals and Average .	4.490	29	17.1	495

I am sure shareholders will agree with me in considering that we have every reason to be satisfied with the above results.

Before the end of this year we should be mining a few thousand tons per month from the reserves in the area south

Native Labour Supply.

On the whole we were better off for kafir labour in 1920 than has been the case for some years. The strength of our force fluctuated between 12,800 and 14,800 and averaged 13,156, as compared with an average of 12,447 in 1919. Since the stoppage of recruiting in tropical areas in 1913 our native labour force has been down to 9.800 and up to 18,600, fluctuations which are not conducive to economic working. It is greatly to be regretted that the Government has so far refused to permit the recruiting of tropical natives notwithstanding the recommendations of the Low Grade Mines Commission and of the Unemployment Commission.

The health of our employes continues to receive close attention. The death rate last year amongst the Europeans in our service was 4.3 per thousand from disease and 1.8 per thousand from accident, making 5.9 per thousand altogether, which is a record. The native mortality was: Mining accidents, 3.1 per thousand per annum; accidents other than mining, 0.2 per thousand per annum; influenza, 4.69 per thousand per annum; other diseases, 8.93 per thousand per annum; making the total mortality from all causes, 16.9 per thousand per annum.

Native Girls as Nurses.

The pneumonia death rate was remarkably low, being 0.74 per thousand, as against an average of 1.4 for the group and 2.55 average for the Witwatersrand mines outside the group. We had only one case of enteric fever during the whole year, which is conclusive evidence of the wisdom of our action in establishing a waterborne sewerage system throughout the property. Five native girls graduated as nurses at our hospital during the year, which is the first time native girls have completed hospital training in the Transvaal. We have recently heard of them, and it is gratifying to know that they are all doing useful work among their own people in various parts of the Union. Dr. Loeser resigned his position as our chief medical officer at the end of last year in order to accept the appointment of senior medical officer of the Crown Mines Benefit Society. Dr. Loeser has been connected with the Crown Mines and its constituent companies since March, 1906, and the success which we have achieved in improving health conditions amongst the natives in our employ is largely due to his devotion, energy, and organising ability. Dr. Donaldson has been appointed medical officer to the company, and he will, I am sure, maintain the high standard which was set by Drs. Irvine and Loeser.

Currency Question.

Dealing with the currency question, Mr. Evans said: The unprecedented fall that has taken place in the purchasing power of gold since 1914 is attributable mainly to the world-wide substitution of paper for gold for monetary purposes. It is true that the United States only departed from the gold standard for a comparatively short period (from September 7, 1917, to June 10, 1919), but prices were forced up in that country owing to the arrival there in 1915, 1916, and 1917 of a great quantity of gold (the excess of imports over exports of gold being 1.132.023.000 dollars, equal to £232.926.500), which had been superseded by paper in Europe, and the fact that the newly-established Federal Reserve system enabled that gold to be used as a basis for an enormous superstructure of deposit and bank note credit. A further cause of inflation in the United States was the action of the Federal Reserve Bank in withdrawing from circulation gold certificates which were fully backed by gold and replacing them by Federal Reserve notes which only required a gold backing equal to 40 per cent. of their face value.

Gold the Practical Medium.

When I last addressed you I expressed the opinion that sooner or later gold would come into its own; that it could not be permanently displaced by paper money, and that a time must come when the world would be forced back to a currency the supply of which is determined by the cost of its production. Everything that has happened since tends to confirm the view that the business of the world, or even that of the smallest country, cannot be carried on indefinitely with an unstable and variable currency, and that under existing conditions gold is the only possible practical medium for a reasonably steady and satisfactory exchange of goods and services between different classes of producers and between different nations; that, human nature being what it is, a money the value of which does not depend on the cost of its production is bound to fail, and that all attempts at making inconvertible paper money a measure of its value, a medium of exchange, and a standard for deferred payments can only prolong depression and aggravate the lot of the populations on whom the experiments are tried. If the League of Nations proves a failure it will be due in no small measure to the disruptive influence of inconvertible paper money, which to the nations of Eastern and Central Europe constitute an almost insurmountable obstacle in the way of friendly commercial intercourse with each other and with the rest of the world.

What the Chart Shows.

Last year I quoted figures giving the extent of the fall in the value of gold when measured in commodities. "The value of money," wrote John Stuart Mill, "is inversely as general prices; falling as they rise and rising as they fall." I have had a chart made showing the variations that have taken place in the wholesale prices of commodities in England since 1782. It is based on index figures prepared by Jevons for the years from 1782 to 1860, and Sauerbeck and "The Statist" for the years from 1860 to date. An examination of this chart, and particularly the decimal average line, shows that the changes in the purchasing power of gold have been :—

Gold fell in value for 23 years from 1786 to 1809;
It rose for 40 years from 1809 to 1849;
It fell for 24 years from 1849 to 1873;
It rose for 23 years from 1873 to 1896;
It fell for 24 years from 1896 to 1920.

You will gather from the chart that in England gold was seriously depreciated in value twice during the 139 years, due in both cases to the excessive issue of inconvertible paper money.

The first period, that of the Bank Restriction Act, which provided for the suspension of specie payments by the Bank of England, lasted from 1797 to 1821, and was described by Lord Overstone as "the dark age of currency." "The Bank Restriction Act," says the eminent Dutch economist, Dr. N. G. Pierson, "reduced the currency of England to a state of chaos." The second period started with the issue, under the Currency and Banking Notes Act, 1914, of 20s. and 10s. legal tender notes, commonly known as Bradburys; and the second dark age of currency will last until England reverts to sound money with a free market in gold. During the period covered by the chart the purchasing power of gold was at its maximum in 1896. The extreme character of the changes that have since taken place, even in a country in which there has been no material or prolonged departure from the gold standard, is brought out very closely in the following table based on Bradstreet's index numbers of wholesale prices in the United States:

	Index numbers.	Variations since 1896	1913
1896	5.9124	100	
1913	9.1862	155	100
1914	8.9142	151	97
1920 January (maximum)	20.8690	353	227
1921			
Feb. 28	11.87	201	129
Mar. 31	11.37	192	124

It will be observed that in the United States prices have fallen 45 per cent. since the beginning of last year, being at the end of March last only 24 points above the 1913 level. It should be borne in mind that Bradstreets's index number, as well as that on which the chart is constructed, refers to the wholesale prices of general commodities, and does not include rent and the cost of services, which as a rule fluctuate less violently and to a smaller extent than commodities. Index numbers strictly comparable with those of England and America are not available as far as South Africa is concerned, but the following, extracted from the Quarterly Abstract of Union Statistics prepared by the Census Department under the direction of Mr. C. W. Cousins, show that the upward movement of prices and the consequent fall in the value of gold has been very great here:

Price Indexes for the Union of South Africa:—

Year.	Wholesale prices. All groups. 1914 1000.	1910 - 1000	1913 1000.
1910	—	1000	
1911	—	1052	
1912		1088	
1913	—	1101	1000
1914	1000	1092	992
1915	1174	1126	1023
1916	1345	1158	1052
1917	1542	1248	1134
1918	1679	1289	1171
1919	1808	1376	1250
1920	2449	1698	1542
Maximum 1920	2549 (July)	1759 (Oct.)	1598
1921			
January	2054	1674	1520
February	—	1623	1474
March	—	1601	1454
First quarter	—	1633	1483
April	—	1573	1429

Year.	Retail prices. Food, fuel, light and rent. 1910=1000.	Food only. 1913=1000.	Percentage increase in the retail cost of food over July, 1914.
1910	1000		
1911	1093		
1912	1146		
1913	1163	1000	
1914	1148	987	—
1915	1228	1056	7
1916	1275	1096	11
1917	1418	1219	24
1918	1437	1236	25
1919	1559	1340	36
1920	2049	1762	78
Maximum 1920	2170 (Oct.)	1866	89
1921			
January	1976	1699	72
February	1893	1628	65
March	1842	1584	60
First quarter	1904	1637	66
April	1795	1543	56

It is also shown in the publications of the Census Department that in the leading towns of the Union regarded as a whole the following amounts were required to purchase what could have been got in 1910 for 20s.:

	1920. Avg.	1920. Max.
Food, fuel, light and rent	33 11	35/2
Food only	41 0	43/5

	1921. Avg.	1921. Max.
Food, fuel, light and rent	32 7	33 5
Food only	38/0	39/6

Taking everything into account it is probable that gold was less valuable in terms of goods and services in the middle of last year than it has ever been. There has since been a fall in commodity prices, recently a phenomenal fall in such staple goods as cotton, wool, maize, hides, potatoes, jute, copper, tin, zinc, etc. Having regard to what has happened before as illustrated in this chart it is, I consider, justifiable to assume that we are at the beginning of a permanent and, in all probability, a prolonged and very far-reaching rise in the value of gold, and that the downward trend of the prices of commodities and services as a whole will continue, no doubt with occasional temporary interruptions, until a complete readjustment of prices has been effected, until a state of equilibrium as between different groups of producers is reached, and until it becomes possible for them to exchange their products on a fair basis whereby they all get an approximately equal remuneration for their capital and labour.

In many parts of the world the purchasing power of the farmer and of some other producers of primary products is to-day below what it was before the war. The history of the past teaches us that there can be no general resumption of business until prices of other things are down to something approaching the level of agricultural and other primary products. This appears to be the view of some of the leading interpreters of economic phenomena in the United States. The editor of "The Economic World" (New York) writes in the issue of that paper of April 16 last that wherever one turns one finds lamentation over a decline of prices and wages. He states that the hope most deeply cherished in the hearts of a great majority of producers and manufacturers is "that there may soon come a turn of the tide of affairs which will bring with it the same rising prices, the same enhanced profits and remunerations of all kinds, and the same sort of so-called prosperity, that attended the great inflationary processes of the period that ended (in the United States) not quite a year ago."

The Editor adds: "But looked at from the standpoint of the ultimate welfare of human society and of every class in it, all this is no more than a vain dream. If anything is certain, it is that the restoration of the economic health of mankind—and consequently of mankind's social and political health as well—and the reconstitution of the only form of prosperity which is permanently valuable, depend upon the prompt abandonment of the entire order of ideas about wages, prices and profits by which the world had begun to be dominated nearly a quarter of a century ago, and which became an almost universal obsession as a result of the economic confusions and dislocations incident to the great war. What human society needs now above all else is not a new era of unsubstantial prosperity due to ever-increasing prices, wages, profits and remunerations of all kinds in terms of money, but long years of steadily increasing production, accompanied by steadily declining prices. True prosperity, the true welfare of all the classes, can be built upon nothing else than an abundance of the real things of life accessible to all at moderate prices. This is the great lesson which the world was now to learn; and whoever points in any other direction is no better than a blind leader of the blind."

Another American writer of high standing on business and economics, Mr. John Moody, insists on the necessity, the inevitableness and the desirability upon every ground of right reason of a long continued and thorough liquidation of the inflation of prices. He maintains that although setbacks may take place, the liqudation of the war inflation is bound to continue. He proceeds:

"The present process of deflation may be interrupted this year; there may be a revival of business accompanied by recovery in average commodity prices; interest rates may hold relatively high for some time to come, and perhaps an autumn stringency may develop. But such tendencies will be short lived and temporary; the trend will again be downward in a little while.

"But it cannot be too strongly emphasised that this predicton of a long downward trend in commodity and money prices does not presage an absence of real prosperity. On the contrary, it implies prosperity. Every day, with declining prices, the cost of living is falling and the buying power of the dollar increasing. Thus falling wages are not curtailing the consuming power of the masses at all; stationary wages are increasing that consuming power. And as industry revives at lower levels, and the cost of living recedes, a relatively full consuming power will be maintained. Further than this, the profits of merchants and manufacturers on smaller margins but in greater volume always make for prosperity."

Mr. W. Mosenthal, head of the firm of A. Mosenthal and Company, appears to have come to somewhat similar conclusions. In a message from Port Elizabeth, published here on the 17th instant, he is reported to have said: "Where wool and other produce have been bought at high prices purchasers must make up their minds to the fact that it is dangerous to rely on any improvement in prices for a long time to come. South Africa must be content to sell her wool at the best price which the world will give for it.

The chart shows that the pendulum has swung very far in a direction adverse to gold mining, possibly farther than it has ever gone before in historic times. It is now swinging back, and judging by precedent it should in time go equally far in the other direction, so that we may see a rise in the value of gold greater than anything that has been experienced since gold has been the money of civilised nations

Mr. George E. Roberts, vice-president of the National City Bank of New York, speaking at the annual meeting of the American Statistical Association on December 29 last said: A period of expansion is likely to overleap itself, and when reaction comes the pendulum swings as far in the other direction."

On another occasion Mr. Roberts said: "Prices may go lower than can be permanently maintained; it is the usual thing in times of reaction that the momentum carries prices too low, just as in times of expansion they are carried too high."

The annual production of gold in the world has diminished by about twenty-seven per cent. since 1915, whilst the probabilities are that in the course of the next few years the demand for gold will be greater than it has been at any time since the adoption of the gold standard by England in 1816. During and since the War the desire for gold among the peoples of the Far East has been enhanced and the use of it for currency purposes has been extended both there and in South America. In Russia, paper money ceased to have any value some time back. An attempt is being made to buy and sell with short dated work vouchers. When that, and perhaps some other equally futile experiment fails, it is almost certain that Russia will come back to gold without any paper money at all in circulation, as Mexico did five years ago, and as France did after the Revolution. And the time cannot be far distant when the areas which constituted the old Austrian Empire and other countries whose paper currencies have become almost valueless will also be obliged to abandon paper money for gold, no doubt with units containing far less gold than their pre-war money.

When Appetite is Intensified.

History shows that the appetite for gold is intensified amongst populations who have for long periods experienced the extreme discomfort and the harassing uncertainty of a constantly depreciating paper currency. The inhabitants of the belligerent countries of Europe will not only want back the £400,000,000 of gold which since 1914 their Governments have exported to other countries in and outside of Europe, but a great deal more. Once they return to specie a reversion to paper money, however well secured, will be most unlikely so long as Governments are subject to the controlling influence of those who have for some years suffered the ruin and misery of an inconvertible paper currency regime. Undoubtedly the capacity of the inhabitants of Russia and neighbouring States to absorb gold is enormous, and it is quite conceivable that in a not distant future the peasants of these countries will be exporting timber, furs, cereals, dairy and other products of the field and the forest at prices in gold lower than anything ever heard of before. That means that it is within the bounds of possibility that the time may yet come when the Crown Mines will find it profitable to start again at the outcrop and mine three pennyweight main reef.

Some people are disposed to argue that the return to gold of the countries now using inconvertible paper money is impossible, because there is not enough gold in the world. That, as Professor Irving Fisher and others have pointed out, is fallacious. Any quantity of gold "whether large or small will do the world's business as soon as the level of prices is adjusted to that quantity." (Page 17, "Why the Dollar has Shrunk.") I hold with the currency school that "a nation which does not use bank notes can never in the long run have too little metallic money in relation to other things."

Not Out of the Wood.

Now, it would be unwise to conclude that we are at the end of our troubles because wholesale prices are rapidly falling. We are not. Gold mining companies will still have a period, possibly even a long period, of considerable anxiety ahead of them, particularly if there is a sudden recovery of the value in gold of British currency unaccompanied by an equivalent reduction in working costs. Let there be no mistake about it; we are not out of the woods yet by any means, and the saving of our low grade mines will require a very persistent and determined effort to obtain for the industry the advantage with the least possible delay of whatever reduction takes place in the price of commodities and in the cost of living. I am convinced, however, that the turning point has been reached, that henceforth gold will rise in value, and that, if justice is secured for this industry, working costs will decrease as prices fall. There will no doubt be fluctuations as in the past, but for a great many years to come the general tendency will be in the direction of an appreciation of gold in terms of commodities and services.

Educating the Public.

What is now taking place will, I hope, educate the public to the fact that all industries here and elsewhere are interdependent and that gold mining companies are not the only sufferers from the dislocation and confusion which have resulted from the substitution of inconvertible paper for gold for monetary purposes I believe that if, twenty years from now, a competent and impartial economist thoroughly investigates the history of this period he will be forced to the conclusion that in countries like South Africa the farmers have been the greatest sufferers from the unsound monetary policy which our Government and most other Governments have chosen to follow. It is true that for a short time our farmers benefited from the disordered currency. When, however, prices fall, as fall they must when the rise is the result of a paper money inflation, the producers of food and raw material, the farmers, suffer first and suffer most. To-day the farming industry everywhere is severely depressed.

Mr. Byron W. Holt, of New York, in a statement published in February last, wrote: "It is apparent that the prices of farm products and of raw materials have declined far more than have the prices of most finished products. Thus, the farmer who sells his products now is unable, with the proceeds, to buy a fair equivalent of manufactured goods. That is one reason why he is not selling freely. Another is that the present prices are frequently not only below costs of production but below the prices on which his bank has loaned money to him. He cannot sell and pay his debt at the bank."

Referring to the "tremendous declines in the prices of cotton, corn and wheat," Mr. Holt adds: "Such a sudden and drastic decline never occurred before. It has greatly disturbed the equilibrium of the purchasing power of the farmer. He is selling only as he has to do to supply his immediate needs. He is buying very sparingly. As he constitutes our most important consuming class, he is largely responsible for slump in railroad traffic."

The Ottawa correspondent of "The Economist," writing on April 11, stated: "The farming community (in Canada) has been very discontented all winter in face of a tremendous decline in the prices of their products, and have complained that it is far in excess of the decrease in the prices of industrial staples. The market for live stock during the past season has been the dullest on record, and many cattle raisers have sustained heavy losses."

The Editor of the "Pastoral Review" (Australia), writing in the issue of that journal on March 16 last, said: "Prices of rural products continue to decline and the costs continue to advance. . . . . Machinery, fencing wire, etc., have risen in price to such an extent that with so many lines of farm produce back to pre-war values, and with the almost insuperable difficulties in the way of obtaining labour, many farms are being turned into grazing areas."

Mr. Hughes, the Prime Minister of Australia, speaking on the 24th of last month, referred to the complete collapse of wool prices and the enormous fall that had taken place in the prices of other primary products, such as lead, copper, tin, zinc and meat, and added that "unless Australia could tide over the period until relatively normal times returned it would see a greater crisis than had ever before arisen." Agricultural papers in New Zealand, the South American Republics and other countries tell the same story. What is taking place to-day confirms the conclusion which an American economist arrived at during the Greenback era in the United

States, namely, that sound money is of greater importance to farmers than to any other class, except, perhaps, owners of gold mines. Were farmers and producers generally to think in terms of commodities instead of in terms of money they would have a clearer conception of the position, and would unhesitatingly use their great influence in favour of the abolition of paper money and a return to a money value of which is dependent on the cost of its production. Before the war farmers exchanged their products for gold (or for something that could be easily and freely converted into gold), and then they exchanged the gold for the things they required. Now, the law—a law for which they are largely responsible—will not allow them to exchange their products for gold; they must exchange them for paper the value of which does not depend on the cost of its production, like gold and mealies, but on the fiat of the Government. Fundamentally, there is no difference between inconvertible paper money and debased coins. "Irredeemable paper," said Professor Hadley, "is subject in an exaggerated degree to all the dangers arising from debased coin." It "is neither more nor less than money on which the Government has charged a seniorage of 100 per cent." The capital, the raw material, and the labour required to produce five £1,000 notes is not greater than what is required to produce 5lb. of tobacco. One thousand £10 notes can be produced for the same expense as one thousand 10s. notes. It is true that the Government says that 77s. 10½d. in paper money can be exchanged for an ounce of standard gold when the paper money becomes as valuable as gold, or after June 30, 1923, unless Parliament decides otherwise. Obviously such a promise is of doubtful value unless accompanied by a definite undertaking on the part of the Government either (a) to pay out gold for notes and remove the embargo on the melting and export of gold coins and bullion at a fixed date unconditionally, or (b) to reduce within a given period the quantity of paper money in circulation until its actual scarcity makes it as valuable as gold. The existing laws here and in many other countries are largely the result of a lack of understanding of the nature and office of money. As far as farmers and all other producers are concerned the main object of money is to enable them to make a reasonably just exchange of what they produce for what other people produce. "Money is always a medium; an intermediate thing; a means, not an end." "It is a tool, an instrument procured solely for the sake of the work it performs." What really matters to the farmer is not what the purchasing power of his yearly crop is in money but what it is in the things he has to buy. If, for instance, he gets in paper money double the 1913 price for his wool, he is still very much worse off if he has to pay treble the 1913 price for the implements, fencing, clothing, groceries and the hundred and one other things he and his family must have.

Remedy for Dislocation.

Now, what is the remedy for the dislocation and confusion to which I have referred? Clearly the remedy is to create a state of affairs which will enable all producers in South Africa to exchange their products among themselves and with producers in other countries on a fair and equitable basis having due regard to the capital and labour devoted to production in each case, and to the abundance or scarcity of the supply of any given product in relation to the demand for it. John Stuart Mill wrote: "Every foreign commodity is bought by giving for it some domestic production; and the labour and capital which a foreign commodity costs to us is the labour and capital expended in producing the quantity of our own goods which we give in exchange for it." Producers are entitled to an approximately equal reward for the capital and labour devoted to the production of what they have to sell. In the address from which I have already quoted, Mr. George E. Roberts explains that there can be no economic health in the world unless the products and services of various classes can be interchanged on a just basis. He states that the Law of Equilibrium is "the master principle which unifies the interests of society and controls by its automatic processes the distribution of the population among the industries and the distribution of products back to the population for consumption." The normal balance, or equilibrium, among the industries is a condition necessary to the highest prosperity of every branch of industry. Without it there cannot be a free and complete circulation of products, or the desired consumption of products. The purchasing power of every group of producers is in the commodities of its own production, and if they are not forthcoming, or cannot be marketed upon terms which sustain their purchasing power, the demand for all other products is affected. We see this truth illustrated now in the situation resulting from the decline in the prices of farm products. If the workers in the other industries might continue to work full time and at the wage rates they have been receiving, they would enjoy great benefits from the decline in farm products, but that is impossible, because their products cannot be sold upon such terms. The loss of purchasing power by the farm population has affected the market for other products. The persistent influence of the economic law to maintain the equilibrium, and its effect upon the distribution of the proceeds of industry, do not receive the attention they deserve. Ignorance of it is responsible for most of the attacks on the existing order."—("The Economic World," New York, January 29, 1921.)

The following table gives some idea of the violent fluctuations that have taken place in the purchasing power of the farmers of South Africa:—

EXPORTS OF WOOL, MOHAIR, MAIZE, HIDES AND SKINS.

Year.	Value recorded.	Value at 1910-13. Avg. price.
	£	£
1910-1913, Average	7,421,765	7,421,765
1914	7,078,355	6,981,279
1915	8,367,722	8,342,105
1916	10,904,182	7,432,267
1917	13,213,761	6,117,512
1918	15,214,312	6,775,365
1919	25,690,380	9,059,141
1920	21,054,166	5,560,554

The prices of most of the above products are now back to the pre-war level; some are even lower, so that in this connection alone the purchasing power of South African farmers has been reduced by some £15,000,000 or £16,000,000 per annum, compared with what it was a year or two ago. That does not by any means tell the whole story. Only the main items of agricultural exports are included in the table. The farmers exported other products of the value of £7,176,989 in 1919 and of £4,433,601 in 1920, the price of which has also fallen. Further, the collapse of the ostrich feather market has diminished the revenues of the ostrich farmers by something like £2,000,000 a year, compared with 1912 and 1913. It must also be remembered that there has been a heavy fall in the price of agricultural produce sold for consumption in South Africa. Taking everything into account, I believe I am well within the mark in assuming that, compared with 1919 and 1920, the purchasing power of the farming community of South Africa has been reduced by more than twenty millions per annum. On the other hand, most of the things which the farmer has to buy are still very much higher in price than they were before the war. Under these circumstances, it is unquestionable that there can be no return to prosperity while such an ill-balanced condition of affairs lasts. Prior to the war a state of equilibrium between industries was maintained by means of the gold standard and the free market in gold, the value of which, to quote John Stuart Mill, "is determined like that of other commodities, temporarily by demand and supply, permanently and on the average by cost of its production." "The value of money," he added, "conforms, permanently, and, in a state of freedom, almost immediately, to the value of the metal of which it is made" . . . "since gold and silver bullion are commodities like any others, their value depends like that of other things, on their cost of production" (Vol. 2, "Principles of Political Economy"). The equilibrium which existed between industries before the war has been destroyed by the widespread compulsory use as legal tender in excessive quantities of inconvertible paper money, which costs little to produce. Governments everywhere have been forcing their people to adopt as a medium of exchange and as a measure of value something that has no value. Professor Bowen wrote: "A measure must be homogeneous with the thing measured; as that which measures length or capacity must itself possess length or capacity, so that which measures value must have value in itself, or intrinsic value" (page 293, "American Political Economy"). Lord Overstone wrote: "Money, it must be remembered, is not only useful as a medium of exchange in lieu of barter or credit, but also as a measure of value; and when paper, in itself possessing no intrinsic value, is used as a substitute and representative of the precious metals, the convertibility of that paper becomes essential for preserving its character as a standard of value. When the convertibility ceases, there is no longer any fixed limit to the amount which may be issued, nor any means of obtaining in exchange for the notes that of which they purport to be the representative. Gold is in this country the measure of all exchangeable value, the scale to which all money prices are referred. Consequently, when the issuer of the paper circulation of a country is driven to the necessity of suspending his payments in specie, the determinate measure of value in that country is lost."

It appears to me certain that the present chaotic conditions are bound to continue until the gold standard is re-established or until some other medium of exchange is discovered which has an intrinsic value independent of the control of Governments and bankers, which is most unlikely. It cannot be right that the farmer should be obliged to sell hides, maize and wool for the pre-war prices or less, and still have to pay 50 per cent. or 100 per cent. more than the 1913 price for the implements—fencing and building material, saddlery, clothing and groceries—which he has to acquire. Evidently there is something wrong, and what is wrong can only be put right by the unconditional and complete abandonment of the attempt to force farmers and other producers to exchange their products through the medium of inconvertible paper money, the value of which does not depend on the capital and labour devoted to its production. I am satisfied in my own mind that the root cause of most of the present disorganisation of industries and the resulting unemployment and distress is this banks and Governments have been empowered to constrain the public to use as a measure of value something that has no value and to pay a remuneration on the capital invested in paper money a thousandfold greater than the remuneration which, for instance, the farmer can make on the capital invested in the production of meat and cereals. So far, civilised man has not evolved banking corporations or Governments sufficiently virtuous and self denying to resist the temptation presented by the enormous profit which accrues from making cheap money by means of the printing Press.

An examination of the present position in this country in the light of the fundamental factors to which I have referred must lead to the conclusion that there is a far closer community of interest between the farming and the mining industry in South Africa than one would ever suspect, judging by recent debates in the Union Parliament. This was clearly perceived a generation ago by one of the ablest statesmen that South Africa has produced, the late Jan Hofmeyr. In a letter which I recently received, a friend in the Peninsula wrote: "In the old Cape days it was looked upon by Mr. Hofmeyr and his followers as a cardinal principle that there should be harmony between the farming and the mining industries in their mutual interests." Let me enumerate some of the considerations which indicate the extent of this identity of interest:

(1) In the last resort, practically the whole of the public expenditure of South Africa has to be provided from the land, either by mining or agriculture, and perhaps insignificant amounts from other industries and from the sea through fishing. What we get from abroad as loans, interest on loans, or payment for services rendered cuts no ice when taken over a period of years. If a large number of mines close down their share of the burden of taxation will perforce have to be borne by the other mines and by agriculture, either directly or indirectly. And it must be remembered that a large portion of the public expenditure of the Union is met by indirect taxes, such as Customs duties, towards which a low grade mine contributes as much as a rich mine, and the farmer more than the mine owner. When a mine becomes unprofitable and ceases to produce wealth, the rest of the wealth producers, the farmers and the remaining mining concerns, have to bear a larger burden or else there must be a curtailment of public expenditure equivalent to the share borne by the mine that has closed.

(2) What I have just said is especially applicable in the case of the railways. Indeed our railways provide a very striking illustration of the interdependence of agriculture and mining. All South African mines, and the vast majority of South African farmers, are dependent on the railways for the transport of what they sell, as well as of what they buy. Railway rates are therefore a matter of vital importance to South African producers generally, and anything that tends to force up the cost of working the railways increases the cost of production and the cost of living to the whole community and checks the progress of the country in all directions. Moreover, additional burdens which the railways have to impose on customers falls heaviest on those who live farthest from the coast. The successful and orderly development of South Africa with its long distances is out of the question without cheap transport, and cheap transport depends to a very great extent on full train loads. The railways administration can serve each of its customers best and cheapest when all are prosperous. Adversity and shrinkage in the case of the agricultural industry or of the mining industry mean an ill-balanced traffic, half-empty trains and a loss of revenue for the railways, which must in the long run lead to more costly transport all round. In other words, the prosperity of the railway depends almost entirely on the prosperity of its customers, and if one class suffers others have to pay high rates in order to make up the loss of revenue, as half-empty trains cost nearly as much to run as fully loaded trains. In no direction is an unsound currency, a currency which leads to an ill balanced production, more harmful to a country like South Africa than in its bearing on the cost of transportation. It adds to the working costs of the railways in two ways. It upsets the just equilibrium which should exist between producers, and thereby diminishes traffic and disturbs the balance of traffic; and also raises the prices of commodities and the cost of living, necessitating heavier expenditure by the Railway administration on stores and materials and on wages and salaries.

(3) The two industries, agriculture and mining, are equally interested in having low costs of production. Most of the output of the mines and a large portion of the products of the farms are disposed of abroad. The farmers export wool, ostrich feathers, etc., whilst mining companies export gold, diamond, coal, copper, tin asbestos, chrome ore, etc., and in both cases the producers have practically no control over the prices at which their products sell, except perhaps in the case of diamonds, and that only to a limited extent. South African producers must accept the world price or not sell at all. The prices they get are the European or American prices, less freight, insurance, commissions, etc. They cannot make the foreign purchasers pay any additions that may be made to their expenditure on account of fresh taxation, and increased transport charges, or defray any other losses they may be forced to incur on account of a bad local currency.

Solution with the Farmer.

It is true that we cannot put the world right, and that, like the United States and Japan, we have to suffer for the unsound monetary policy of other countries; but we need not aggravate the position here by enforcing the use of a money which must in the nature of things upset the just basis for exchanges among producers in South Africa itself. According to the 1918 Union Census, 166,000 Europeans are agricultural producers, as compared with 32,000 Europeans occupied in producing gold, coal, diamonds, tin, copper and all other minerals. The farmers can, if they choose, enforce a currency policy which will secure a square deal for them and for other producers in South Africa. Unfortunately, up to the present, racial and purely political considerations, which lead only to strife and stagnation, have monopolised the attention of a majority of them.

As Mr. Merriman said in a speech at the opening of the Agricultural Show at Worcester on February 11 last, "farmers are going to have a bad time, for one reason, because there is too much politics in business and too little business in politics."

In 1913 the Union Government appointed an Economic Commission under the chairmanship of Mr. (now Sir) S. J. Chapman, Professor of Poltical Economy at the University of Manchester, to inquire into and report upon, inter alia, the wages, working hours, and the cost of living on the Witwatersrand and other industrial centres in the Union compared with those prevailing in other parts of the world, and the cost of production in the Union compared with that of other countries. That Commission reported at the beginning of 1914 and found, amongst other things, that for Europeans the cost of living and wages were very much higher in South Africa than in America, Canada, and Australasia. The valuable data which are published quarterly by the Census Department show that for Europeans the cost of living, including rent, is still higher in the Union than in any other British Dominion. I doubt if the farmers and their leaders paid much attention to the Report of the Economic Commission, although the conclusions were of very great importance to them. As I have shown, the farmer here cannot fix the price at which he has to sell his staple products; those prices are fixed abroad and not in South Africa. The farmer, however, can influence the cost of producing, handling and transporting his products in South Africa, and that is practically the only means he has of increasing or maintaining his profits. I do not think that farmers realise that the amount of the expense involved in the operations mentioned depends on the cost of living not only on the farms but in the country as a whole, and that it is therefore to the interests of the farmers and of other South African producers that the cost of living for Europeans should be as low as possible. Labour is also equally interested in having a low cost of living, as every reduction in the cost of living means an increase in real wages.

I have been told, and I believe it to be the case, that land is cheaper in South Africa than land of similar quality with equal railway and export facilities in Canada, Australasia and the Western States of America. Why? I suspect that the right answer is that, owing to the higher cost of production and of transportation here due to the higher cost of living for Europeans, the real earnings of the South African farmers are less per acre or per morgen than those of farmers in the countries mentioned. It does not seem that the representatives of the farmers in Parliament have yet realised that by promoting measures which add to the cost of living, and consequently to the cost of production and transportation on the Witwatersrand and in other industrial centres they are automatically adding to the costs of the farmer and of the Railway administration, as the cost of living on the Witwatersrand and in the industrial centres sets the standard for the country at large. As I have shown, the producers of South Africa, like those of Australasia and Canada, cannot control the prices at which their staple products sell. It therefore follows that the value of land and the amount of the real reward of capital and labour here and in the Dominions mentioned depend on the cost of living, and that, other things being equal, the Dominion which has the lowest cost of living, should enjoy the greatest prosperity, because its products will have the highest purchasing power in the markets of the world, and the real reward of its capital and labour will be greatest. One of the chief factors bearing on the cost of living is currency. Last year I gave my reasons for holding that countries with a gold currency only (with token coins of cheaper metal with limited legal tender for small change) had some advantage over countries with convertible paper money, however well secured. That was practically the position of England before the war, as no notes could be issued for amounts of less than £5 or for a greater total amount than £18,450,000 unless entirely covered by gold. There is evidence that the effect of the extensive employment of even convertible paper money in the United States has been prejudicial to the interest of the producers of exportable goods, particularly the farmers. American economists have shown that throughout the history of the United States the tendency has been to penalise the agriculturalist and other producers of exportable articles compared with other classes, and that paper money has been the prime agent in this operation. I maintained when we last met, and I still maintain, that the note-issuing provisions of the Union Currency and Banking Act, 1920, will operate in a manner prejudicial to the interests of South Africa, because they permit of an extensive dilution of our currency with paper. In fact, the profits of the Central Reserve Bank will depend in no small measure on the quantity of paper money which can be kept in circulation. As a result, there will in all probability be more money in circulation than would have been the case had there been no paper money, or had the law fixed a definite and reasonably low limit to the fiduciary issue as was done in England under the Bank Charter Act. In other words, the chances are that our circulation under normal conditions will be excessive and will consequently tend to keep the cost of living in South Africa higher than it would otherwise be, to the distinct prejudice of the agricultural classes and other producers of exportable goods. General Walker wrote: "The instructed man of to-day desires that the world generally and all other countries shall have a full circulation, while he would like for his own country, if that were possible, just a trifle less than its distributive share of that supply, so that it may be a good country to buy in and not a very good country to sell in. He desires to have prices everywhere well sustained, in order that trade may be good. He would like, if that were possible, to have prices in his own country permanently lower, though only a shade lower, than anywhere else, in order that his countrymen may get a just share of that trade" (page 61, "International Bimetallism"). Even with a purely metallic currency gold producing countries have usually in circulation more money than they really need, with the result that the level of domestic prices and the cost of living is higher than it otherwise would be, and that in such countries farmers and others who produce things for export are slightly handicapped as compared with the producers of similar goods in other countries. This is an additional reason why the Parliament of the Union should have hesitated a great deal before adopting the note-issuing provisions of the Currency and Banking Act of 1920 provisions which will undoubtedly tend to aggravate the monetary position from the point of view of our farmers and other producers of exportable articles.

Reversion to Gold Standard.

I think South African producers would have been a good deal better off had provision been made in the Currency and Banking Act for a gradual reversion to the gold standard on lines similar to those adopted in England in 1819. In the debate on the Currency and Banking Bill in the House of Assembly on July 15 last year, General Hertzog suggested the consideration of such a plan. In the 1819 Act the Bank of England was required to redeem its notes in bullion, paying for them at first a price about equal to what was then their market value as indicated by the premium on gold, but making small additions to this price at the end of certain periods till the notes were finally brought up to par with specie. As Professor Bowen points out: "This scheme proved so successful, and the general disturbance of the markets created by it was so slight, that the Bank of its own accord, with the general assent of the mercantile community, anticipated the period of full resumption."

The addition of such a provision to the Currency and Banking Act would have introduced an element of stability into the exchange situation, which would have tended to curb speculation and to keep down prices and the cost of living. It would, I am sure, have materially helped the wool farmers and other exporters of South African products.

Supreme Issue for Gold Mining.

My excuse for dealing with the currency problem at such length at our annual meetings is the fact that it is to-day, and has been for several years, the supreme issue for gold mining companies, and indeed for all other producers in South Africa, particularly producers dependent on the export market. Our prosperity and the prosperity of the whole country now and at all times depends upon the enactment and enforcement of wise laws on monetary matters. I fully realise that, with politicians and bankers so strongly wedded to paper money, to preach the gospel of sound money has so far been a thankless and unpopular task in South Africa; but a time must come, as the result, I am afraid, of a bitter and ruinous experience, when the Government and the Parliament of the Union will be forced to the conclusion that we are not going to restore prosperity and contentment until producers are enabled to exchange their products on a fair basis, a basis which will provide a reasonably equal reward for capital and labour in each industry; that a state of equitable equilibrium between industries is unachievable without sound money, without a measure of value that has value; and that no contrivance of man, however ingenious, will enable sound money to be made out of paper.

It remains for me to record your directors' appreciation of the able and loyal services rendered to the company by Mr. Stuart Martin, our consulting engineer, Mr. Walton, the general manager, and the managers and staff at the mine and at the head office during the year. I may add that Mr. Walton left on a well-deserved holiday at the end of last month, and that during his absence Mr. J. E. Healey is acting as general manager.

I now beg to move that the directors' report, balance sheet and accounts for the year ended December 31, 1920, laid before the meeting be received and adopted.

The motion was seconded by Mr. J. L. Jourdan, and, on being put to the meeting, was carried unanimously.

THE CITY DEEP.

The annual meeting of the City Deep, Ltd., was held in the board-room, Corner House, Mr. J. R. Leisk, C.M.G., presiding.

The Chairman said: Before we proceed to examine the reports and accounts of our company for the year 1920 it is desirable, I think, to remind shareholders that, in making any comparison of the figures set out therein, with the figures of previous years, they must not overlook the change in our capital and property accounts that has been occasioned by the acquisition, a year ago, of the City and Suburban mine, plant and equipmenut. As will have been seen from the annual report and accounts now before us, this transaction is reflected in the balance sheet as at December 31 last by an increase of £121,500 on both sides of that account. It was reasonable, therefore, to expect that our profits for the past year would be greater—owing to the increased capital thus invested in our company—and also that our tonnage would show an increase owing to the corresponding addition to our mine property. To the foregoing extent, therefore, we must discount the improvement in our 1920 results in order to obtain a true comparison with the results of the preceding year.

However, even if we make the most liberal allowance for this discount factor, the returns now before us must be regarded as exceedingly satisfactory. At £649,348, the working profit for the year shows an increase of £191,661 over the profit of the previous twelve months, while the rock crushed was 862,500 tons an increase of 244,000 tons over the corresponding figure for 1919. It must be remembered, too, that these results were achieved in spite of the dislocation at the mine occasioned, in the first place, by the native disturbances in February of last year and, secondly, by the strike of white workers in November last.

More Rock Crushed.

While the higher price realised for our gold during 1920 was largely responsible for the increased profits earned by the City Deep, the remarkable expansion in the quantity of rock crushed during the year was a factor of at least as great importance in achieving these increased earnings, and this, in turn, was attributable to the enlarged native labour supply provided by the absorption of the City and Suburban mine. Incidentally, I may remind you that while, when negotiations were proceeding, your board were satisfied that the tangible assets to be acquired from the City and Suburban Company were good value for the consideration offered to that company, our main object in putting through this transaction was to secure the consequential supplement to our supply of native labour. The board's policy in this respect has been more than justified, as will be seen from the reports by the consulting engineer and manager. Prior to the absorption, our native labour force was always inadequate, whereas, following thereon, the City Deep plant was run to its full capacity for the first time in its history.

In another direction, too, the good native labour supply will be of great value to your company. I refer to the opportunity thus afforded of reducing the average grade of ore mined to a grade more in accordance with the value of our reserves. The factor of increased tonnage should admit of this being done without diminishing the profits yielded by the property. The need for such a policy has several times been impressed upon shareholders as the records of previous meetings will show; and there can be no doubt as to the wisdom of following this course.

Average Earnings and Costs.

Now, if you will look for a moment at the published statements, you will see that at £1,951,330, the revenue from mining operations during 1921 exceeded that of the previous year by £637,313—equivalent to an addition of 2s. 8d. per ton milled. Against this, however, there was an increase of £445,651 in working expenditure, representing 2s. 5d. per ton milled. It would not have been unreasonable to expect that the substantial increase in our tonnage milled would have brought about a reduction in the working costs per ton, but our hopes in this respect were dispelled by the heavy additions last year to the wages bill of our white employes. These additions, it is interesting to note, have had the effect of raising the average earnings of each individual by roughly £10 per month, as compared with 1919, and involved, in the aggregate, an increased expenditure of nearly £169,000, or 1s. 3d. per ton milled. Native wages, too, show an increase of over £86,000, equivalent to 9d. per ton milled, while stores and materials have likewise continued to rise in price, the extra cost of these commodities being, in round figures, £138,000.

Net Profit.

The net profit for the year—viz., £644,184, together with the unappropriated balance of £245,471 brought forward from 1919, and a small amount in respect of dividends forfeited, in all £890,095, was carried to appropriation account and applied as follows:

Expended on capital account, £97,995; less proceeds from sale of stands, receipts under Bewaarplaats Act and value of liquid assets taken over from City and Suburban Co., £12,471 £75,523; Government taxes, £96,121; dividends Nos. 16 and 17, of 12½ per cent. and 20 per cent. respectively, £415,250—£586,894, leaving a balance of £303,201. Of this balance, £118,940 was represented by net cash and investments, the remainder consisting of stores and materials, sundry debtors, etc., as detailed in the directors' report.

I would now invite your attention to the very important question of mine development. No doubt you will have remarked the decrease during the last few years in development footage, and the decrease at the end of 1920 in the volume and average value of the ore reserves. So long, of course, as our native force remained inadequate, any increase in development could only be secured at the expense of current mining; but, as I have already indicated, our labour supply has been greatly improved by the City and Suburban absorption, and since the beginning of the current year it has been possible to do a great deal more towards maintaining our reserves. In this connection I may observe that the development footage driven for the first four months of 1921 has exceeded that for the corresponding period of 1920 by 1,459 feet, equal to an increase of 365 feet per month. It would be difficult, however, to give any useful review of the values of this most recent development, owing to the fact that the bulk of the driving has been in the footwall of the reef, and consequently very few complete reef exposures have been made. All that can be said is that these exposures indicate normal values.

Reorganisation of City and Suburban.

You may ask why it was that, with the increased labour force available for the greater part of last year, an earlier commencement was not made with the more vigorous development programme. The answer is, that the reorganisation necessary to make a success of the absorption of the City and Suburban mine entailed the use of a considerable amount of native labour, and delayed the diversion of the boys to development work.

In consequence of the conditions to which I have just alluded, the ore mined last year from the reserves was not replaced by the ore developed. Moreover, the ore devedoped during 1920 was somewhat below the value of the ore mined from reserves; the City and Suburban brought some ore of lower grade into the payable reserves, and, finally, owing to increased working costs 301,200 tons of a low grade had to be eliminated from payable reserves.

As a result of all these factors the ore reserves as calculated at December 31 1920, show a decrease of 318,850 tons in volume and of 0 1dwt. in value, as compared with the reserves at the commencement of that year. It should not be forgotten, however, that if working costs decrease, as it is earnestly to be hoped they will, a large body of developed tonnage will be restored to the payable ore reserves.

Rapid Development.

Another factor that has retarded development during the past year is the fact that the winding capacity of the two incline shafts has been insufficient for effective handling of the tonnage for the mill, and the rock broken in shaft sinking, and men and material. To meet this difficulty, a second winder has been installed in No. 1 shaft, and has been running since the end of last month, while a new engine chamber has been cut at No. 1 shaft, and a new winder is at present in course of erection. When both these winders are running, it will be possible to sink the two incline shafts more rapidly, and thus accelerate the adoption of a policy of more rapid development.

Progress throughout the year in the sinking of the south shaft was steady. A monthly average of 121 feet was maintained, notwithstanding difficulties experienced through encountering excessively hard rock; and at April 30 of this year, the shaft was down 3,200 feet, leaving 1,300 feet to complete the first stage. It is anticipated that the sinking of this first stage will be completed about the end of the year. The 17th level main crosscut, which is being driven to intersect the shaft at the 4,500 feet mark, is now only 1,065 feet from the shaft.

With regard to the expenditure upon the south shaft, the estimate is £238,500 for sinking and temporary equipment, preparation of site, etc. Of this sum £160,821 had been expended to the end of last month, leaving a balance of £77,679 still to be spent. Later on, of course, it will be necessary to set aside a substantial sum out of the profits to provide for the permanent equipment of this shaft.

The installation is being proceeded with of the central pumping plant to deal with the water which will flow into the City Deep from the workings of the adjacent outcrop mines when the latter close down, and we are now awaiting the arrival of pumps and motors on order.

Tonnage Milled.

As regards the general situation during the expired portion of the current year, the tonnage milled continues to increase, and the average yield is higher than last year by about .5dwt. On the other hand, costs also are above the average of last year, owing to the small tonnage milled in February, when the strike of white workers occurred, involving a stoppage of work for nine days. Mention of the increased yield of .5dwt. for the last four months leads me to repeat and emphasise how essential it is for the future of the company that a grade of ore should be mined more in keeping with the grade of the ore reserves—profits being maintained by milling a greater tonnage. The completion of the installation of the second winding engine at No. 2 incline shaft will greatly facilitate the reversion to this policy. As this shaft has had to handle most of the men and material for the mine, it has been impossible to haul through it the amount of ore that should have come from the lower section of the mine, with the result that we have had to mine a larger amount of ore from some of the richer blocks in the upper portion of the property, giving a yield higher than is justified.

In conclusion, I very much regret to say that the City Deep has recently lost the services of its valued consulting engineer, Mr. E. H. Clifford, who, for private reasons, has decided to sever his connection with the Witwatersrand. Mr. Clifford devoted a great deal of his time and attention to our property, and the sound position of the mine today is due, in great measure, to his technical skill and foresight. I know that I am voicing your feelings in wishing him success in whatever new sphere of activity he may elect to use his great abilities. Mr. Clifford has been succeeded by Mr. A. J. Brett, and to him we extend a cordial welcome. We have the utmost confidence that under Mr. Brett's guidance the City Deep will continue to make satisfactory progress.

A word of special thanks is due to the manager of our property, Mr. Percy Sherwell, and his staff, for the manner in which they have overcome the exceptional difficulties of the past twelve months.

I now beg to move that the directors' report, balance sheet and accounts for the year ended December 31, 1920, laid before the meeting, be received and adopted.

The motion was carried unanimously.

MODDER "B" RESULTS.

Speaking at the annual meeting of the Modderfontein B. Gold Mines, Ltd., Mr. J. R. Leisk, the chairman, said:—The main point that emerges from a perusal of the reports and accounts now before you is that notwithstanding the difficulties and embarrassments of the year 1920, the working profits earned by your company, viz., £918,423, exceeded by some £72,000 the record established in the preceding year. This das due, of course, to the high level of prices obtained for our gold, more particularly during the last six months of the financial period, and but for this fortunate circumstance our accounts would have exhibited a different showing, as, despite the utmost vigilance, our working costs for the year were 26s. 1d. per ton milled as compared with 22s. 5d. for 1919.

As you will see from the reports, we crushed 627,700 tons of ore during 1920. Compared with 1919 this is a slight falling off and without any significance, but what is most significant, is that it cost us a record high expenditure to produce our last year's tonnage—the figure being £818,327, or some £90,000 more than the corresponding figure of 1919. This increase in working costs was caused principally by the higher wages of white employes, increased costs of stores and materials and additional demands in respect of miners' phthisis.

The appropriation account opens with the balance of £233,704, brought forward from last year. Adding to this amount the net balance of working expenditure and revenue account, for 1920, viz., £917,915, and also a small sum of £912 in respect of forfeited dividends, we get a total credit in the 1920 appropriation account of £1,152,531. This amount was applied as follows:—

Capital expenditure, £163,020; less Bewaarplaatsen accruals, £18,205	£144,815
Government and Provincial taxes	135,314
Dividends Nos. 16 and 17 of 32½ per cent. and 50 per cent. respectively	577,500
	£857,629

leaving a balance of £294,902 to be carried forward to 1921. Of this balance some £75,000 was represented by net cash and investments, the remainder being composed of stores and materials, sundry debtors, etc., as shown in the directors' report.

With regard to our capital account, you will have observed that during the year under review we expended, in round figures, £163,000 upon capital works. Of this sum £135,000 was absorbed in the sinking of, and the provision of surface equipment for, the south-eastern and south-western vertical shafts—the balance being expended upon various essential works, including the provision of a supplementary water supply, to which I shall refer later.

Ore Reserves.

Now, if you will glance for a moment at the position of our ore reserves, you will notice that the re-calculation as at December 31 last gave a figure of 3,006,600 tons, of a value of 8.6dwt. over a stoping width of 64 inches. This constitutes a decrease of 208,500 tons in colume, and of .4dwt. in average-value, as compared with the corresponding calculations at December 31, 1919. In view, however, of the very substantial character of our reserves, this relatively small drop in quantity and value is of no actual significance. Furthermore, I may remind shareholders that the causes of the drop, as explained by the consulting engineer, were of a temporary nature and have since disappeared. In the circumstances, therefore, and keeping in mind the anticipated early completion of our shaft-shinking activities, our ore reserve position should, before long, show a steady improvement.

Turning now to the more detailed aspect of our development, you will have seen that the south-western shaft, which was commenced in February of last year, had reached at December 31, a depth of 1,180 feet. On March 12 last, the reef was intersected in this shaft at 1,488 feet —the value for a complete section taken round the shaft giving an average of 29dwt. over 14in. or 460in. dwt. At date there are still some 150 feet of sinking to be done in order to reach the intended depth of about 1,800 feet. Since the commencement of the new year a connection has been effected between the shaft and the crosscut from the fifth level. The permanent headgear has been erected, and your consulting engineer is sanguine that towards the end of the current year the south-western shaft will be in active commission, hoisting ore from the deeper levels on the western side of your property. As I mentioned to you last year, the completion of this important addition to our working arrangements will provide greater flexibility of underground operations and will permit of a simplified dealing with the deeper ground in that section of the mine adjoining the Modder Deep, New Modderfontein and Government Areas properties.

Stand-by of Property.

If you will refer to the plan of workings attached to the annual report you will see that the south-western side of the mine continues to be the stand-by of your property. The development done during the past year in this section represents 12,235 feet, or some 70 per cent. of the year's total mine development—exclusive of sinking the new vertical shafts—and, speaking generally, the results of this work were quite satisfactory.

The south-eastern shaft reached its final depth of 1,743 feet during the year, the reef intersection at 1,496 feet being in disturbed ground of unpayable value. Although disappointing, this condition of the reef was not unexpected, and in no respect does it alter the programme of exploring the south-eastern area. Accordingly, the work of cross-cutting is being pushed on with vigour in order to pave the way for development on the reef, more particularly in the direction of what is known as the Geduld raise. which, as you know, has given promising indications. During 1920 we advanced a further 759 feet in this Geduld raise, through faulted ground, the approximate position of the reef being ascertained by diamond drilling. The face is now some 1,500 feet distant from the south-eastern shaft; and a connection will be effected as rapidly as possible after active development from the shaft becomes practicable. I may here recall that the values in the Geduld raise averaged 672in. dwts. for 1,000 feet.

With regard to the north-eastern section of the property, it will be gratifying to you to know that recent work on this side of the mine, in a new winze below the third level, exposed high grade reef averaging 1,474in. dwt. for 60 feet sampled.

Eastern Side Development.

Development generally in the eastern side of the mine during the past year totalled 5,166 feet or some 30 per cent. of the year's development footage on the whole property. Of this total, 1,365 feet, or 26 per cent., disclosed reef, of which more than half was payable, averaging 495in. dwt. During the expired portion of the year now current, 1,559 feet of development has been recorded, rather more than one-half of which has disclosed reef, of which 500 feet are payable, averaging 525in. dwt. You will see, therefore, that there have been some tangible results from the development of the more readily accessible portions of the eastern side of the mine. Incidentally, I may mention that the change over from sinking equipment to cage hoisting at the south-eastern shaft will be effected very shortly, which will enable development in that region to be prosecuted with greater freedom and expedition.

Modder East Loan Capital.

I should now like to say a few words regarding a recent participation by your company in the provision of certain loan capital for the Modderfontein East Company. You will notice, on the credit side of the balance sheet, an item of £23,012, representing our holding, at December 31 last, of 23,012 shares of £1 each in the Modderfontein East, Limited. It will be within the recollection of many shareholders that Modderfontein B. was an unsuccessful tenderer for the leasehold Government ground which was ultimately secured for, and is now being worked by, the Modderfontein East Company. However, our belief in the future of this ground adjoining our property was such that, although we failed in our efforts to obtain the lease from the Government, we secured from the Central Mining and Investment Corporation, Limited, a participation of 7 per cent. in the initial underwriting of the capital of the Modderfontein East Company. Thus it was that we originally became interested in our eastern neighbour. Recently we were offered a participation of similar percentage in a secured loan of £400,000, which will shortly be made by the Central Mining and Investment Corporation, Limited, to the Modderfontein East, Limited, and, after full consideration, your board decided to avail themselves of this offer. The loan in question carries interest at the rate of 8 per cent. per annum and is repayable at December 31, 1922. During the currency of the loan the lenders have the right to convert into shares at par, and in view of the security for this loan and the potentialities of the Modderfontein East mine, it is a reasonable anticipation that this investment will prove a profitable one for our shareholders.

Water Supply.

Adverting now to the question of our water supply, as many of you are aware, the Modderfontein B mine derives a considerable proportion of its water from the Geduld property. In July of last year we were threatened with a curtailment of our supplies from this source, owing to a fall in the level of the President dam. Accordingly, in order to supplement our supplies, a pipe line was immediately laid to the Modderfontein East property, and by this means the danger was averted. But, at best, this is only a temporary expedient, and, in order to avoid all possible risk for the future, arrangements are now being discussed for the connecting up of your mine with an extended Rand Mines service supply, which should effectively safeguard us against any shortage of water in the future.

Mining Apprentices.

Arrangements were concluded in November last for one of the stopes in the mine to be worked by apprentices from the new Government Miners' Training School on the company's property, and I am glad to inform you that though doubts were at first entertained as to whether the young miners would be able to reach and maintain the standard of work demanded of our underground employes, they have shown progressive improvement, and the latest results are quite encouraging. It is satisfactory to know that the practical training of these youths is being carried out under modern conditions, and that the effect of that training will assist in securing a supply of qualified underground craftsmen for the industry.

The splitting of your company's £1 shares into shares of the nominal value of 5s. each has been completed. In view of general representations, from our shareholders in the Union and elsewhere, that the high market value of our £1 shares made them unwieldy and inaccesible to the small investor, resolutions were carried at extraordinary general meetings, called for that purpose on September 8 and 30 last, authorising the division of our £1 shares into shares of 5s. each. The new certificates and share warrants were issued in due course

Capital Expenditure.

The capital expenditure for the current year is estimated at £166,000. This sum includes provision for the additional sinking necessary to reach the final depth of the south-western shaft, the equipment of that shaft with ore bins, both on surface and underground, and its connection with the reduction plant by a surface haulage. Moreover, it is proposed to add to the crushing plant another tube mill unit. This will enable a reduction to be effected in the residue value, and also give greater assurance of continuous crushing up to the maximum of our capacity.

Other works which are urgently needed, and for which the above estimate provides, are such items as additions to married quarters, change houses, offices at the new shafts and certain extensions to the native compound.

Current Operations.

I come now to current operations on your property. According to the ascertained results of the four completed months of the current year, the mining operations on your property exhibit a consistent all-round improvement; and, unless something unforseen should happen, there is no reason why these results should not be maintained, more especially when the proposed additional tube mill unit is erected. The question of future profits is more difficult to forecast, as these depend upon the fluctuating price of gold. At the present time the market value of our product is considerably below the average of last year, while our working costs are substantially above that average. These considerations, which are common to the whole industry, have obliged the Chamber of Mines to take action in the direction of securing, through wages, a reduction in working expenditure, and discussions on the subject are now proceeding.

Happy Results.

In conclusion, I would invite your attention to the fact that the report and accounts for the year ended December 31 last complete the first decade of your company's milling operations, during which period profits aggregating £5,900,000 have been made. Of these profits rather more than four and a quarter millions have been paid in dividends to shareholders; in other words, during the first decade of its existence the company has repaid its nominal issued capital more than six times over. On the other hand, during the same period of ten years, £5,893,000 has been spent upon development, equipment and general mining operations, of which by far the greater portion has been distributed in this country. Further, an analysis of the accounts reveals that over the said period no less a sum than £806,000 was paid in direct taxation of profits. These figures illustrate in the clearest possible manner what an important factor a well-established gold mine is in the economic life of South Africa, and they also indicate the extent to which the industry contributes to the general welfare and prosperity of the community.

I am sure that you will join with the board in expressing our appreciation of the valuable services which continue to be rendered to the company by Mr. H. Stuart Martin (our consulting engineer), Mr. C. L. Butlin (the manager on the property) and also by their respective staffs.

I now beg to move that the directors' report, balance sheet and accounts for the year ended December 31, 1920, laid before the meeting, be received and adopted.

The reports and accounts were adopted.

ROBINSON G.M. CO.

The annual meeting of the Robinson G.M. Co., Ltd., was held in the Board Room, Corner House, Mr. F. Raleigh presiding.

The chairman said: When last we met in general meeting I stated that assuming all essential factors remain as they then existed, the mine should be able to earn monthly profits to the end of that year (1920). Shortly after our meeting the price of gold rose, and as against an average price realised for the first six months of 1920 of 99s. 6d. per fine ounce, we obtained an average of 114s. 3d. for the last six months of the year. This improvement enabled a higher profit to be earned than was foreseen at our last annual meeting.

The report and accounts before you give full information regarding the company's operations for 1920, and show that a working profit of £86,200 was earned, which is £10,200 in excess of the working profit earned in 1919.

The tonnage milled averaged practically 40,000 tons per month, a slight increase over 1919.

Thanks to the increased price of gold obtained last year the revenue showed an increase of 7d. per ton, notwithstanding a heavy drop of .65 dwt. per ton in the yield, which only averaged 4.36 dwt. This decrease even at the standard price of gold, represents a reduction in revenue of about £70,000 below that obtained from the ore milled in 1919.

Working Costs.

It is satisfactory to note that working costs only advanced 2d. per ton, notwithstanding increased prices for stores, large increases given last year for white wages, amounting to over £20,000 (10d. per ton milled) and to the increased assessment to the Miners' Phthisis Compensation Fund, £4,800, and increased cost of holiday and sick leave pay, £3,200, as compared with the year before. That working costs have not risen more is due to the management's careful economies and to the generally improved efficiency obtained in the use of labour and stores.

The profit earned is increased to £107,600 by taking into account the various other items specified in the working expenditure and revenue account and the appropriation account now before you, including £15,500 for dividend on Crown Mines, Ltd., shareholding.

This sum has been dealt with as follows: Paid for taxes, £12,434; paid in dividend to shareholders, £82,500; leaving £12,682 to be added to the unappropriated balance, which is increased to £186,089 at the end of the year.

We commenced the year under review with 229,400 tons of ore in reserve, i.e., in the main reef leader and south reef, including shaft pillars. At the end of last year there were 115,200 tons remaining, showing a falling off of 114,200. The tonnage mined for the year totalled 475,400, the difference between this tonnage and that taken from the ore reserve being obtained from the tonnage mined from the low grade main reef body, and also from reclamation in our own mine and the tributing of adjoining abandoned low grade areas in the Crown Mines, Ltd., and Ferreira Deep, Ltd.

Chief Source of Supply.

It will be realised that the main reef ore body is now our chief source of supply. During last year it represented about 59 per cent. of the tonnage mined, having risen to that from about 39 per cent. in 1918. To-day it is even higher and represents about 70 per cent. The gradual depletion of main reef leader and south reef ore reserves in the mine, and the substitution of an increased tonnage from the main reef accounts for the fall in yield of recent years. The main reef, of which there is still an ample quantity, is, generally speaking, unpayable by itself at to-day's level of working costs, and, as far as can be seen, mining operations will cease with the exhaustion of the main reef leader and south reef ore before the main reef body is exhausted. Our costs are to-day the lowest of any amongst the Witwatersrand gold mines. In 1915 the working costs were 13s. 7d. per ton milled to-day, as you know, they are 20s., namely, an increase of 6s. 5d. per ton, equal to an increase of 47 per cent. The working costs of to-day exceed the price above standard now being received for gold by 2s. 9d. per ton milled, which on the present monthly tonnage of 40,000, and low yield of 4dwt. per ton, means that at pre war working costs and standard price of gold we could make £3,500 per month more profit than is now being earned. Dealing with the position of the mine as it stands to-day, with gold realising about 102s. 6d. per fine ounce, working costs at about 20s per ton it is now necesary to work the best ore in the mine at a greater speed or otherwise working losses will be made and the closing of the mine might come about before this ore can be mined. The effect of this speeding up will be to bring about the cessation of operations earlier than would otherwise be the case.

Future Life of 12 Months.

As far as can be seen at present, all factors being as they are to-day, the mine has a possible further life of about 12 months. If the price of gold falls further, without there being any relief in working costs, the best ore in the mine will be worked by double shift, and the closing down of the mine thus brought about earlier. In these circumstances the mine might survive for say a further six months. The results for the first four months of this year have produced an average monthly working profit of only £815 against an average profit of £7,180 for 1920. In considering these results it is only fair however, to exclude the results obtained in the month of February, when a loss of £3,000 was made owing to a strike among our underground miners; leaving that month out of the calculation the average profit for the remaining three months is £2,000 per month, equal to 1s. per ton milled. If gold should fall a further 5s. per fine ounce, this small margin of profit will disappear. Regarding our holding of Crown Mines, Limited, shares, that company paid dividends totalling 77½ per cent. during last year, which is higher than it has paid since 1914. The Crown Mines, Limited, annual meeting was held yesterday, when the chairman referred to the valuable ore which was being opened up in the lowest levels south of the South Rand Dyke, the average results obtained in the south reef and the main reef leader for 4,500ft. sampled showing a value of 17.1dwt. over a reef width of 29in., which is equal to 495 inch-dwts.

I desire to record the Board's appreciation of the services rendered by the consulting engineer, Mr. H. Stuart Martin; the manager at the mine, Mr. G. Hildock-Cmith, and his staff, also to the staff at the head office.

I now beg to submit that the director's report, balance sheet and accounts for the year ended December 31, 1920, laid on the table be received and adopted.

The motion was adopted unanimously.

BANTJES CONSOLIDATED.

The annual meeting of the Bantjes Consolidated was held in the board room, Corner House, Mr. F. Raleigh in the chair.

The Chairman said: From the report of the directors, which is now before you, it will be seen that the work carried out on your property during the past year consisted of the final clean up of the reduction works, which was completed in July last, resulting in a further profit of £3,598, and the continuation by the Consolidated Main Reef Mines and Estate, Ltd., of the exploratory drive into this company's claim ground. The clean up of the reduction works commenced early in 1919, and, including the above profit, a total profit of £16,403 has resulted from this work.

During the year the exploratory drive progressed 597 feet, making its total length 1,663 feet from our company's eastern boundary. As before stated, the object of the drive is to test the values in the company's mining area at a depth considerably below the present mine workings. It was first started in 1915, when the company was carrying on milling operations, with the object of testing values on our eastern boundary. After 422 feet of driving had been done it was stopped, having proved that payable leader existed in our claim area there. In all 270 feet were sampled, giving an average value of the leader and main reef of 6.7 dwts. over a reef width of 62ins., equal to 415 inch-dwt., which was considered to be a quite satisfactory prospect. When it was decided to close down our mine at the end of 1918, arrangements were made to lease an area of our claim property to the Consolidated Main Reef Mines and Estate, Ltd., on our eastern boundary measuring 1,000 feet on the strike of the reef and about 2,000 feet on the dip—in all about 26 claims. The terms of the arrangement then made included the continuation of the exploratory drive to the boundary of the leased area at the Consolidated Main Reef Company's expense, and thereafter at this company's expense. The Consolidated Main Reef Company repaid this company's previous expenditure on the 433 feet driven, so that the whole of the first 1,000 feet of driving has been done at no cost to this company. Early in 1920 the drive reached the boundary of the leased area, and at the end of last month it had reached a total distance of 1,650 feet from our eastern boundary measured from point to point, being 650 feet west of the leased area. The values so far encountered since driving was restarted have not been in keeping with those previously disclosed, and have been unpayable.

Unpayable Values.

The consulting engineer's report, written in January last, states that the drive was then in dyke—this dyke proved to be 285 feet wide. The values obtained in the 70 feet of driving which has since been done west of the dyke are still unpayable. Another borehole has lately been put from the drive to the south reef with unsatisfactory results. The board intends to continue the drive for a distance of 500 feet beyond the dyke, when, should the values still be unsatisfactory, shareholders will be called together to consider the liquidation of the company. In view of the large unexplored claim area owned by our company, your board considers it to be its duty to continue the drive as stated—it will then be some 1,550 feet from the point where it would reach the line of the incline shaft, and will then only have tested about one-third of the company's claim area on this horizon. The amount expended on this work to end of last month is £4,328. As a set off against this, £1,908 has been received from the Consolidated Main Reef Co. as royalty from the leased area. Assuming the drive is discontinued at 500 feet from the dyke, it has a further distance of 430 feet yet to go, and, at the present rate of progress, it will take a further eight months from the end of last month to reach that point. At our last meeting I advised you that the Consolidated Main Reef Company had decided to discontinue the development of the leased area; that company is still mining from the area developed by it and I believe we may reasonably expect ultimately to receive a sum not less than the sum we shall have expended on the exploratory drive if it is discontinued 500 feet west of the dyke.

The accounts before you show that the balance to the credit of appropriation account is increased by £17,260 for the year, bringing it up to £121,860, which is represenetd by the company's cash and cash assets as detailed in the directors' report.

Florida Lake Foreshore.

Some time ago the board was approached by the Roodepoort-Maraisburg Municipality who were desirous of getting possession of the foreshore of Florida Lake, with the object of beautifying it for public use, boating, bathing, etc. Realising that any improvements in this direction would be of advantage to our Florida township, where we still have a large number of stands for sale, the board has done all in its power to meet the Municipality, and an arrangement has been come to under which, whilst our company retains its right to use the water in the lake, the Municipality is given free use of the foreshore for public purposes.

Arising out of this arrangement the Board has also sold to the Municipality the two blocks of buildings and cottages originally built for staff and reduction men's quarters adjoining the lake, and lately occupied by the Government Miners' Training School under lease, together with about 28 acres of freehold with certain trees thereon for the sum of approximately £10,000, of which £2,375 was received last month; the balance is payable over three years, carrying interest at 6 per cent. per annum.

Since the close of the year the demand for the Company's Florida Township stands has improved, and 32 stands have been sold for about £1.650—most of these have been sold on terms. During the previous five years only 52 stands, realising £2,695 were sold. It would thus appear that the township is coming into favour. There are 631 stands and four reserves still unsold.

I now beg to move that the directors report, balance sheet and accounts for the year ended 31st December, 1920, laid before the meeting, be received and adopted.

The motion was carried unanimously

BARNATO GROUP.

NEW PRIMROSE.

Speaking at the annual general meeting of shareholders of the New Primrose Gold Mining Co., Ltd., Mr. John Munro, who occupied the chair, in submitting the adoption of the report and audited accounts, said :—

Your directors beg to submit for your adoption their report and the audited accounts for the year ended December 31, 1920.

The ore crushed at your mine during the year amounted to 232,100 tons, being an increase of 21,200 tons as compared with the previous year. The average value of the gold recovered amounted to 23s. 1d. per ton, as compared with 21s. 8d. in 1919, but the wroking costs were 2s. 8d. per ton higher, with the result that the working profit for the year amounting to £31,715 was £9,664 less than for the previous year. A dividend of 5 per cent. absorbing £16,250 was declared payable to shareholders registered on December 31, 1920.

Several years ago your directors realised that the company's operations could not be carried on for long from the Primrose ground alone, and they were always on the alert to secure other ground to supplement the ore being mined from our own property. We were able to arrange to mine ground on our western boundary belonging to the Simmer and Jack Company which was inaccessible to that company on account of caving. Over two years ago the liquidators of the May Consolidated found it impossible to continue mining operations at a profit, and we purchased their claims, as the remaining ore could be economically worked through our drives. We have since then drawn a considerable percentage of the tonnage sent to the mill from this source, and I am pleased to say the ore was of quite satisfactory value.

Passing of the Glencairn.

The Glencairn Company went into liquidation during the year, as mining operations could not be carried on at a profit. We purchased their mynpachts, and it was arranged that the Knights Deep should clean out the eastern section of the Glencairn Mine, and your company the western section. Unfortunately the fire at the Knights Deep mill prevented that company from carrying out any work, but the New Primrose re-equipped the old western shaft of the Glencairn Company, and is now reclaiming ore from that section.

The ore reserves which at the end of 1919 stood at 45,400 stoping tons were reduced at the end of 1920 to 26,500 tons. From the manager's report it will be seen that only 10,390 tons of payable ore were developed during the year.

It will thus be realised that the mill was almost entirely kept running from reclamation and the gleaning being carried on over a wide range of old workings, not only in the Primrose, but in the May Deep, May Consolidated and in the western section of the Glencairn Mine.

Development is now completed but shareholders can rest assured that so long as reclamation can be carried on without loss the New Primrose Company will continue operations. There is still a lot of reclamation to be done in the large area now being worked, and under favourable conditions it is hoped that mining will be carried on for some considerable time.

I now beg to remove the adoption of the report and accounts.

After being seconded the resolution was unanimously agreed to by the meeting.

NEW UNIFIED REEF.

Mr. John Munro presented the directors' report and audited accounts at the annual general meeting of the New Unified Main Reef Gold Mining Co., Ltd., in the board room, Consolidated Buildings. In the course of his speech he said:

The quantity of ore crushed during the year amounted to 128,500 tons, which was 12.900 tons less than for the preceding year: the recovery value of the ore being, however, slightly higher than for 1919. The working costs were 5s. per ton higher, the increase being due chiefly to increased cost of labour, additional contributions under the Miners' Phthisis Act, and the cost of gold realisation. The working profit amounted to £41.037 as compared with £36.338 for the year ended December 1, 1919. A balance amounting to £19.217 was brought forward from the previous year, and the directors declared dividends of 5 per cent. and 10 per cent., payable to shareholders registered on June 30 and December 31, 1920, respectively. The total sum payable in respect of these dividends amounted to £37.500, and a balance of £18,316 was carried forward to this year.

Development on this mine is now completed, but there is still a certain amount of reclamation work to be carried out.

The ore reserves, which were recalculated at the end of the year, were estimated at 83,000 tons of an average value of 6.2dwts. over a stoping width of 46 inches, as compared with 149.000 tons of an average value of 6.5dwt. over 47 inches of reef at the end of 1919; the reduction being due to depletion during the year of reserves which could not be replaced.

The End in Sight.

During the year a portion of your property known as "Eagle Farm," situate on Vierfontein, No. 15, was sold for the sum of £2,055, which is reflected in the balance sheet now submitted.

During the first four months of this year the crushing at the mine has been maintained at the average of the previous year, and it is pleasing to note that the working costs show a reduction of 1s. 3d. per ton, as compared with last year's costs.

The mine is undoubtedly nearing exhaustion, and must shortly close down unless there is a further substantial reduction in working costs, as most of the ground still to be reclaimed is of low grade and cannot on the present level of costs be worked without loss.

On September 1, 1920, Mr. W. A. Krige was re-appointed manager of your mine in the place of Mr. T. B. Bruce, who retired.

I now beg to move the adoption of the report and accounts.

Having been duly seconded, the resolution was unanimously carried.

LANGLAAGTE ESTATE.

In submitting the report and accounts of the Langlaagte Estate and Gold Mining Co., Ltd., at the annual general meeting of shareholders, Mr. John Munro, who occupied the chair, said :—

The quantity of ore crushed during the year amounted to 465,300 tons, which was slightly less than that crushed during 1919, when 475,489 tons were crushed. The recovery, which averaged 5.965dwt. showed an improvement on the previous year when the average recovery was 5.850dwt.

In common with other mines, the working costs were higher, the increase being due to the increased cost of labour, miners' phthisis contributions and the cost of gold realisation.

The working profit for the year, including the premium received on gold, amounted to £153,353 as compared with £146,989 in 1919.

Two dividends, representing 10 per cent. on the issued capital of the company, absorbing £88,650 were declared during the year, and a balance of £88,046 14s. 6d. is carried forward to this year's account against £60,795 18s. 10d. brought forward from 1919.

The capital expenditure for the year amounted to £58,466, and was expended on mine buildings, machinery and plant, and shaft sinking, against which there were recoupments from sales of township stands of £4,045, the sale of Robinson building £17,043, and sales of machinery and plant £4,414.

Shaft Sinking Continues.

The development footage accomplished was 9,913 feet as compared with 10,576 feet for the previous year, and the results obtained were satisfactory, 53 per cent. of the footage on main reef leader and 89 per cent. of the footage on south reef being in payable areas.

The ore reserves, which were estimated at the end of the year at 1,016,800 tons of an average value of 6.4dwt. over a stoping width of 55 inches, are slightly less than at the end of 1919, but now that the shafts are well advanced we hope to show some increase during the current year.

Shaft sinking was pushed forward throughout the year, the footage sunk in the Hebbard shaft being 278 feet, while 574 feet were sunk in the main shaft.

Since the beginning of the year a further 166 feet have been sunk in the Hebbard shaft and 184 feet in the main shaft. Crushing during the four months of this year, with the exception of February, when the operations were affected by the strike of miners, has been maintained at the average of the previous year. Working costs for the four months show a slight increase, but this is due to the high costs in the month of February.

The mine is still suffering from shortage of natives. At the end of April, including contractors' natives, the company had 3,703 natives as compared with an average of 3,899 for 1920.

Mr. Krige, who was transferred to another mine of the group during the year, was succeeded by Mr. T. H. L. Paull as manager of your property.

I now beg to move the adoption of the report and accounts.

The report was duly seconded and adopted.

GOVERNMENT GOLD MINING

The annual general meeting of the Government Gold Mining Areas (Modderfontein), Consolidated, Ltd., was held in the board room of the Consolidated Buildings. Mr. John Munro presided, and there were also present Messrs. W. M. Munro, C. Marx, J. F. Rutherford, J. G. Lawn, C.B.E., F. Leslie Brown, D.S.O., G. J. Joel, H. A. Rogers, J. H. Crosby, A. Lipman, I. Kanter, J. M. Starfield, G. S. Kope, F. Hilner, J. R. Nicholson, E. Danckwerts, C. Sampson, J. E. Hamilton, A. Ravno, B. P. Wellbeloved, A. Sprinz, A. Hyman, R. G. Hales, with Mr. Frank Hall, representing the secretaries, and Mr. E. H. Francis, the transfer secretaries.

In moving the adoption of the report, Mr. Munro said:

I have once more great pleasure in congratulating the shareholders on the continued success of the company. Each succeeding year since its inception has been one of advancement and improvement. Last year the quantity of ore crushed was 1,515,000 tons, being 154,000 tons higher than for the previous year with a corresponding increase in the number of ounces of fine gold produced. The working costs at 22s. 2d. per ton show an increase of 1s. 2d. per ton, due principally to higher wages, but the figure of 22s. 2d. I think you will agree with me, considering the conditions prevailing, is satisfactory. The working profit for the year totalled the record figure of £1,708,164, as compared with £1,246,875 in 1919, the increase being due to the increased tonnage crushed and the higher premium received on the gold.

Dividends of 20 per cent. and 30 per cent., absorbing £700,000, were declared payable to shareholders registered on June 30 and December 31, 1920, respectively. These dividends also constitute a record in the history of the company.

You will see from the accounts that the estimated share of the profits for the year payable to the Government in terms of the lease amounts to £882,975, as compared with £605,370 in the previous year, making a total of £2,158,634 paid to the Government since the commencement of the lease.

The capital expenditure for the year amounted to £49,301, and was expended on a new 100-drill turbo compressor at the north-west shaft, additions to the crusher plant, a bakery, and extensions of the compounds.

Development Results

Your consulting engineer draws attention to the excellent results shown by the development work throughout the year, and while the ore reserves show a small decrease on the previous year, the decrease is due to a more conservative method of calculating the reserves, and the figures of 10,291,000 tons of an average value of 8.2dwt. over a stoping width of 77 inches are most satisfactory. The plan which, following our usual custom, accompanies the report, will give shareholders a good idea of how widely the ore reserves are distributed throughout the mine. As I pointed out last year, it is not the aim of the company to increase the ore reserves, but rather, while maintaining the position, to provide sufficient stope faces to ensure at all times an adequate supply of average grade ore to the mill. The policy indicated last year of the intention to explore portions of the property about which comparatively little is known, is being actively pursued.

You will have noticed that your consulting engineer in his report refers to the question of ventilation which has been for some time receiving careful consideration. Up to the present time only one shaft—the north-east—has been an upcast, but the work of making the south-east shaft an upcast also is proceeding, and it is expected that this will effect a great improvement. As the area of the workings grows larger, it will almost certainly be necessary to sink a new shaft in the centre of the property for ventilating purposes only.

Such a shaft would be a circular one: it would have a depth of approximately 3,500 feet, and should ensure the adequate ventilation of the mine throughout its life.

Big Ore Redemption.

The question of increasing the crushing capacity of the plant has engaged the attention of the board, but after consideration of the problem the directors are not satisfied that such an increase is advisable at present. The matter will not, however, be overlooked, and if a time should arrive when it is felt that the position at the mine makes it possible, and the best interests of shareholders make it desirable, the necessary steps will be taken to enlarge the plant. In order to increase the efficiency a further unit, consisting of conveyor and sorting belts, grizzley crusher and motor, has been added to the crusher station.

The work of redeeming the ore in packs, and of washing and sweeping the footwalls of stoped-out areas, is now a regular and most profitable operation, and is carrried on systematically in each mine captain's section. During the year 139,612 tons with an average value of 9 dwt. were recovered from these sources.

The Present Year.

I will now touch on the results of the first four months of this year. The quantity of ore crushed during this period amounts to 516,000 tons, being an average of 129,000 tons per month, which is an increase on the average of last year when an average of 126,250 tons per month was crushed. The profit, notwithstanding the lower price of gold which was taken at £5 5s. 0d. for January, and £5 3s. 9d. for the other three months, averaged £129,568 as compared with £142,347 for the previous year when gold averaged £5 12s. 7d. per ounce.

It is also pleasing to note that the working costs show a slight reduction, the average for the four months being 21s. 11d. per ton as compared with 22s. 2d. for 1920.

The average number of natives at work underground showed an increase of 765 per day over the preceding year. The mine continues to be a popular one with natives, and if the supply is maintained there should be no difficulty in continuing to work the plant to its fullest capacity.

Mr. C. Marx, jun., assumed the management of your property on the 1st December, 1920, in place of Mr. H. Mitchell, who had been acting as manager.

The motion for the adoption of the report and accounts was put to the meeting and carried unanimously.

The retiring director, Mr. D. Christopherson, was re-elected, and Messrs. Douglas Low and Co. and Mr. E. Danckwerts were reappointed auditors.

WITWATERSRAND G.M. CO.

The annual meeting of the Witwatersrand Gold Mining Company, Ltd., was held in the board room, Consolidated Buildings, Mr John Munro presided, and there were also present Messrs. C. Marx, J. G. Louw, C.B.E., W. Ross, W. M. Munro, L. Edwards, J. F. Rutherford, J. H. Crosby. Mr. Frank Hall represented the secretaries and Mr. E. H. Francis the transfer secretaries.

The Chairman said: I beg to submit for your approval and adoption the directors' report and the audited balance sheet for the year ended December, 1920.

The purchase from the liquidators of the Ginsberg Gold Mining Company of its water right and the sale of the Government and the New Transvaal Chemical Company of 863 morgen 332 square roods are duly reflected in the balance sheet

Towards the end of the year 47 claims of the Knights Deep ground were taken over by this company, and is being worked on a royalty basis. Although most of the claims have been partially worked it is hoped to obtain from them a substantial tonnage, which can be handled economically through our south vertical shaft, and would help to keep the battery more fully supplied than it would otherwise be.

The quantity of ore crushed at your mine during the year amounted to 416,200 tons, which was an increase of 19,250 tons on the tonnage milled during 1919, the recovery value of the ore being practically the same as the previous year. In common with other mines the working costs were higher owing to the increased cost of labour, contributions under the Miners' Phthisis Act, and the increased cost of gold realisation and bank exchange. The working profit, which amounted to £133,757, was £44,381 higher than for 1919, the increase being due to the increased price of gold and higher tonnage milled.

Your directors were able to declare dividends of 5 per cent. and 15 per cent. to shareholders registered on June 30 and December 31 respectively, the amount paid out being £93,925. The unappropriated balance was increased from £155,606 18s. 8d. at the end of 1919 to £204,284 0s. 10d. at December 31, 1920.

The capital expenditure, which totalled £19,539, was expended on sinking and equipping the southern incline shaft, a pump station at the 27th level, and providing transport facilities for the Knights Deep ore. The southern incline shaft was sunk 36 feet to a total depth of 3,353 feet, and was stopped at that depth for the time being, as the prospects in the bottom of the mine were not very encouraging.

A total of 9,139 feet of development was accomplised as compared with 9,742 feet in 1919. The ore reserves which, following our usual custom, were recalculated at the end of the year, were estimated at 774,500 tons of an average value of 6.0dwt. over a stoping width of 63 inches.

During the first four months of this year the mine has been suffering from a shortage of native labour, and the monthly tonnage crushed is about 2,700 tons less than the average for last year. In consequence of the decreased tonnage the working costs are about 1s. 5d. per ton higher, and the working profit, owing to this and the decreased price received for gold, is lower. It is hoped that with an increased complement, we shall be able to keep the tonnage crushed up to the average of the past year.

The motion for the adoption of the report and accounts was put to the meeting and carried unanimously.

The retiring directors, Messrs. C. Marx and J. Munro, were re-elected, and Messrs. C. Stuart and F. E. Roberts and F. W. Diamond and English were re-appointed auditors.

RANDFONTEIN CENTRAL.

Mr. John Munro presided at the Randfontein Central Gold Mining Company, Ltd., meeting, and there were also present Messrs. C. Marx, J. G. Lawn, C.B.E., J. H. Crosby, W .M. Munro, J. F. Rutherford, H. A. Rogers, N. J. Scholtz, W. Adam, and Mr. F. Hall, representing the secretaries.

Mr. Munro said: For your consideration and adoption I beg to submit the directors' report and audited accounts for the year ended December 31, 1920.

The quantity of ore crushed during the year amounted to 1,560,000 tons, which was 169,400 tons less than the tonnage milled in 1919. This decrease was due to a series of causes, which are fully dealt with in the consulting engineer's report. The working costs per ton were higher than for the previous year, due chiefly to the increased cost of labour, contributions under the Miners' Phthisis Act, gold realisation charges, and to the smaller tonnage dealt with. Consequently the working profit, which amounted to £158,100, was lower by £150,989 than the profit for 1919, when it amounted to £309,089.

Owing to the closing down of certain portions of the mine and to shortage of native labour, the tonnage crushed during the past four months has been lower than the average crushed during the previous year. As a consequence of this the working costs show an increase of 1s. 1d. per ton, and this, together with the lower price received for gold, has brought the profit for the four months down to £43,646.

Pumping Plant.

Sinking in the north vertical shaft was stopped at a depth of 3,896 feet in the early part of last year, but sinking was continued at the south vertical shaft until January of this year, when it was stopped at a depth of 4,712 feet. The pumping station was completed, and the pumping plant at the north vertical shaft was brought into operation in April of last year. The plant consists of four 13-stage Sulzer centrifugal pumps, each pump having a capacity of 80,000 gallons per hour. The quantity pumped at present amounts to about 4,000,000 gallons per 24 hours, and under normal conditions is handled by two of the four pumps, the other two being in reserve. It was the intention on the completion of the north and south vertical shafts, and the transport systems underground from the various sections, to have in readiness an electric hoist at each of these shafts capable of dealing with the large concentrations of ore. These hoists will be capable of winding a five-ton load of rock from a maximum depth of 5,000 feet at a speed of 4,000 feet per minute. It was expected to have the new hoists running about the middle of July. The failure to deliver the electric portions of these hoists up to time has disturbed and delayed these arrangements, with resultant serious loss to the company. At the north vertical shaft, owing to the shallower depth, it was possible to make the change over and hoist a limited tonnage of ore with the existing steam hoists, and in December last arrangements were completed for hoisting ore through this shaft, and all rock from the Robinson section has been hauled through it from that time. Block A section has also now been linked up with this system.

Southern Vertical Shaft.

The south vertical shaft, being of much greater depth, presented more difficulty in the change over with the existing plant, but owing to the continual caving, cost of maintenance, and delays experienced in the old north sub-incline shaft, it has been decided to hoist the ore from this section through the south vertical shaft in smaller skips pending the completion of the electric hoists. It is expected to have the necessary alterations completed some time in July, after which date hauling through the old north shaft will be discontinued, and the ore from the north section hoisted through the new south vertical shaft. By this means it is hoped to increase considerably the quantity of ore sent to the mill from this portion of the property.

The mechanical portions of the new hoists are at present being erected, and the latest advices regarding the electrical parts are that they will be shipped at the end of May, and provided there are no further delays in the delivery of this machinery it is anticipated that the hoists will be in commission, and these two deep shafts running normally, by the end of the year.

In accordance with the policy indicated last year, No. 8 section of the northern division has been closed down, but the premium on gold has enabled us to continue operations on the Ferguson and east, reef sections on a somewhat reduced scale.

Southern Section Development.

Development in the southern section continues satisfactory, the percentage of payability is high and values are well maintained. At the end of the year the ore reserves were estimated at 3,593,410 tons, of an average value of 6.2dwt. over a stoping width of 40 inches; this quantity includes all ore of a value of 5dwt. and over.

During the year under review your board entered into a provisional agreement with the directors of the Randfontein Deep, Ltd., for the purchase of the property and assets of that company (excluding cash) for 250,459 £1 shares in your company. Their action was confirmed at a meeting of shareholders held on September 17 last, and the capital of your company has been increased by that amount.

Active prospecting operations were commenced on this ground in July last, and on reference to the consulting engineer's report you will notice that the results so far obtained are distinctly encouraging.

Two new five compartment incline shafts have been started to develop the reefs outcropping on this property. As a certain quantity of ore will shortly be available from some of the workings at the southern end of the ground, we are at present connecting these workings with the railway siding in order to transport this ore to the mill.

Capital expenditure during the year amounted to £312.656 19s. 9d., principally incurred in sinking and equipping the two deep level vertical shafts.

Debenture interest, amounting to £138,780 1s. 4d., was paid during the year, and £115,700 of debentures redeemed by the seventh instalment. On account of the eighth instalment, due for redemption on March 1, 1921, debentures amounting to £122.600 were purchased before the end of the financial year.

The loan from the Randfontein Estates Gold Mining Company (Wit.), Ltd., which stood at £698,000 at the end of 1919, was increased to £868,000 at the end of the year under review.

Reorganisation Nearly Completed.

The scheme of reorganisation is now nearing completion. It has been a long business, and its cost has been greater than was anticipated, largely owing to the difficulty of getting work done quickly and economically; and it must be remembered that it has practically amounted to the opening up of a new deep level proposition at the bottom of the old mine. This year will see the end of abnormal capital expenditure, and there is every hope that next year will see substantial benefits from the completed reorganisation of the mine. I now beg to move the adoption of the report and accounts.

The retiring directors, Messrs. N. J. Scholtz and Charles Marx, were re-elected.

Messrs. C. L. Andersson and Co. and Mr. H. J. Lamb were appointed auditors.

RANDFONTEIN ESTATES.

Mr. John Munro presided at the annual meeting of the Randfontein Estates G.M. Co. (Wit.) Ltd., and there were also present: Messrs. J. G. Lawn, C.B.E., S. Marx, J. H. Crossby, W. M. Munro, J. F. Rutherford, H. A. Rogers, N. J. Schlotz, G. J. Joel, J. E. Hamilton, M. L. Pessen and Mr. F. Hall, representing the secretaries.

Mr. Munro said: The directors' report and audited accounts for the year ended December 31, 1920. are submitted for your approval and adoption.

Action Against Sir J, B. Robinson.

Randfontein Estates v. Sir Joseph Robinson.—Before reviewing the company's financial position. I will take this opportunity to refer to the action instituted by your directors against Sir Joseph Robinson, which has caused an enormous amount of work and worry during the past four years.

I have hitherto refrained from making reference to this action as it was sub judice, but I now feel at liberty to place the position before shareholders as judgment has been pronounced by the Transvaal Division of the Supreme Court and by the Appellate Court, sitting at Bloemfontein.

The action was based on two distinct counts, the first being that Sir Joseph Robinson should account to the company for the profit made by him on the Waterval Trust transaction, and the second that he should account to the company for the profits he made on certain claim transactions.

The grounds for the action were: that while chairman of the company, Sir Joseph bought the properties privately and resold them to the company at a profit to himself.

In the Transvaal Division the case was heard before Justices Wessels, Mason and Gregorowski, and judgment was given in our favour by a two to one majority for £215,000 (this being the profit he made out of the Waterval Trust transaction), with simple interest at 6 per cent. per annum from February 27, 1907, to date of payment, but we were non-suited on the claim transaction count. Sir Joseph Robinson appealed against the judgment, and we cross-appealed on the claim transaction.

Appellate Court's Judgment.

The appeal was heard at Bloemfontein in December last before Chief Justice Sir James Rose-Innes, and Justices the Hon. Sir William Solomon, G. G. Maasdorp, Sir Henry Juta and L. S. Bristowe, when the judgment of the Transvaal Division with regard to the Waterval Trust transaction was unanimously upheld. The Appellate Court also gave a unanimous judgment in our favour in respect of what was known as the Home Syndicate claims deal, with the proviso that if parties could not agree upon the amount of profit made by Sir Joseph, were we to apply to the Transvaal Division for a ruling. The solicitors are unable to arrive at a basis upon which to assess the profit made on these claims, so the matter will have to form the subject of further litigation.

Our solicitors have been served with notice that it is Sir Joseph's intention to apply to the Privy Council for permission to appeal against the judgment of the Appellate Court. As an appeal to the Privy Council cannot be claimed as a right, we insisted upon payment of the award in connection with the Waterval Trust transaction, and have received an amount of £391,155 11s. 6d. in settlement of same.

Served with a Summons.

Sir Joseph Robinson v. Randfontein Estates.—We have been served with a summons on behalf of Sir Joseph Robinson for the payment of the sum of £315,750, being the loss alleged to have been sustained by him in connection with a share transaction entered into sixteen or seventeen years ago. I cannot at this stage discuss the merits of the case, but may inform shareholders that our solicitors advise us that we have a good defence.

Although summons was served on us early in January last and pleadings filed, Sir Joseph has not as yet proceeded further in the matter.

I shall now proceed to deal with the accounts before you, and as this is a propriety company I shall take the balance sheet before dealing with the year's operations.

Liabilities.

The capital of the company remains unchanged at £5,001,548.

The seventh redemption instalment of the first mortgage debentures amounting to £77,100 purchased in the previous year, has been written off, and the amount outstanding reduced thereby to £1,430,260. During 1920 we purchased £81,700 of debentures to meet the redemption instalment due on March 1, 1921, at a discount of £10,086 6s. 3d. These debentures have since been cancelled and the transaction will be reflected in the current year's accounts.

Shareholders will notice from the balance sheet that the account "reserve for depreciation" has been reduced by £198,715 2s. 3d., which represents the writing down for your holdings in the Randfontein Central and Langlaagte Estate companies to market value at December 31 last by £194,070 2s. 3d., and writing off stores which had become obsolete by £4,645.

The loan from the Johannesburg Consolidated Investment Company was increased during the year from £285,610 to £336,000. This money was required to enable this company to assist the central company in carrying out its reorganisation scheme. The receipt of the money obtained under the judgment as previously explained enabled this debt to be liquidated. I may here mention that the income of this company is not sufficient to meet the current requirements of the central company, and we have had to again apply to the Johannesburg Consolidated Investment Company to assist us in financing the company.

The other items on the debit side of the balance sheet do not call for special comment.

Items on Credit Side.

Two items on the credit side call for special mention—namely, "Randfontein Central debentures" and "Loan to Randfontein Central Company."

Randfontein Central Debentures.—According to the debenture mortgage bond the annual drawings are increased every year as the interest payable becomes less. The instalment taken up at the end of 1920 was £122,600 against £115,700 taken up the previous year.

This company holds the entire debenture issue of the central company, and in order to avoid the formality and expense of drawing, the stipulated value of debentures are sold to the central company before the date when the drawing should take place, and cancelled by that company when the date for payment arrives.

Loan to Randfontein Central Company.—This has been increased during the year from £698,000 to £868,000, and has since the close of the financial year been further increased to £980,000.

As already stated this company holds the whole of the central company's debenture issue, amounting at the end of the year to £2,315,600. It also holds 2,980,141 shares out of its issued capital of 4,750,459 shares of £1 each. The fortunes of the two companies are therefore so intimately connected that it is incumbent on this company in its own interest to assist the central company in completing its scheme for the reorganisation of the mine workings.

A copy of the directors' report, balance sheet, and the proceedings at the annual general meeting of the Central company will be furnished to our shareholders with the proceedings of this meeting.

Amalgamation Abandoned.

When the companies passed under the present control, it seemed to your directors unbusinesslike that two companies whose interests are closely bound up together should run as separate units, and a scheme for their amalgamation was formulated which was considered beneficial to both companies. It was approved of by the London Committee and several of the largest shareholders of both companies, but we found a stumbling block in the debenture bond of this company, which stipulates that it was necessary to pass an extraordinary resolution of debenture holders which required the representation of a clear majority in value of the whole of the debenture holders, to sanction the scheme. The vast majority of our debentures are issued to bearer, and the holders' address is not registered in the company's office. Although every effort was made to trace them, it was found quite impossible to get the necessary representation in order to give effect to the extraordinary resolution. For this reason your directors had to abandon the proposed amalgamation.

Randfontein Township.

At our last annual meeting I informed shareholders that negotiations were well advanced for the establishment of the Randfontein Township. I am pleased to be able to report that the plans of the township have now received the conformation of the Surveyor General and the township proclaimed. We have started to sell stands, and the result so far has been quite satisfactory.

Turning to the profit and loss account, it will be seen that general revenue, dividends and debenture interest amounted to £213,454 13s. 11d., whilst a saving of £5,925 0s. 3d., was effected by the purchase of £77,100 value of debentures in the open market instead of drawing that amount at par. The principal items of expenditure are £83,775 6s. 0d., for debenture interest, and £6,929 0s. 1d. for income tax. The balance to credit of this account has been increased from £648,882 at the end of 1919 to £760,331 at the end of the year under review.

Inquiry has been made why this large surplus is not distributed to shareholders by way of dividend, but when it is remembered that this company had advanced the central company at the end of the year £68,000, it will be apparent that a dividend distribution is at present impossible.

I now beg to move the adoption of the report and accounts.

The appointment of Mr. J. H. Crosby as a director was confirmed, and the retiring director, Mr. S. B. Joel re-appointed.

Messrs. C. L. Andersson and Mr. H. J. Lamb, were re-appointed auditors.

CONSOLIDATED LANGLAAGTE

The annual meeting of the Consolidated Langlaagte Mines, Ltd., was held in the board room, Consolidated Buildings. Mr. John Munro presided, and there were also present Messrs. C. Marx, J. H. Crosby, G. C. Fitzpatrick, W. M. Munro, J. F. Rutherford, F. L. Marx, C. Sampson, P. N. Boulton. Mr. Frank Hall represented the secretaries, and Mr. E. H. Francis the transfer secretaries.

The Chairman said: I beg to submit for your adoption the directors' report and audited accounts for the year ended December 31, 1920.

The quantity of ore crushed during the year amounted to 503,900 tons, which was 3,900 tons less than during 1919, and the profit obtained, namely, £185,109, is practically the same as for the previous year.

The capital expenditure, which amounted to £16,609, was expended on shaft sinking, the east shaft being sunk 354 feet, while the west shaft was sunk a distance of 149 feet, and, as will be seen from the manager's report, the necessary stations in these shafts were cut. Machinery no longer required was sold for £1,439 8s. 4d.

Development totalled 11,125 feet as compared with 16,245 feet in 1919, but the percentage of payability was discouraging, and the consulting engineer points out that the results obtained in the bottom of the mine were unsatisfactory. Recently, however, the development has shown some slight signs of improvement. The ore reserves at the end of the year were estimated at 1,339,000 tons, of an average value of 6.2dwt. over a stoping width of 51in. and include ore of a value of 5dwt. and over. The reduction in the reserves is partly due to depletion during the year, which could not be replaced, and partly to the fact that the main reef leader stopes proved more patchy than had been anticipated, so that certain blocks previously included had to be eliminated, and the remainder of the reserves on the main reef leader were reduced by one-third as a precautionary measure.

Two dividends amounting to 12½ per cent. were declared, and absorbed the sum of £118,750. The usual annual drawing of debentures to the value of £25,000 takes place to-morrow, and the bonds drawn will be paid on July 1 next. The liability under this head will then stand at £25,000, the whole of which falls to be paid on July 1, 1922.

The strike of miners which took place on this mine during February last adversely affected the operations of your company, and during that month the mill only ran for seven days, consequently crushing during the first four months of this year was considerably less than the average for 1920. During April, however, 43 000 tons were crushed, and every effort will be made to maintain the monthly tonnage at last year's average.

The mine is suffering from a shortage of native labour, the average at work underground during this year being only 2,288 as compared with 2,625 last year.

The motion for the adoption of the report and accounts was put to the meeting, and carried unanimously.

The retiring directors, Messrs. J. G. Lawn and S. B. Joel, were re-elected, and Messrs. Douglas Low and Co and Mr. W. Fergusson were re-appointed auditors.

VAN RYN DEEP.

Mr. John Munro presided over the annual general meeting of the Van Ryn Deep, Ltd., which was held on May 27, in the board room, Consolidated Buildings. There were also present Messrs. Wm. Munro, C. Marx, I. Kanter, H. A. Rogers, J. H. Brown, J. H. Crosby, J. F. Rutherford, E. H. Read, E. M. Hind, G. J. Joel, W. T. Warrener, A. Ravno, G. S. Kope, F. Hilner, J. R. Nicholson, E. R. Grant, J. M. Starfield, A. Lipman, E. E. Rundle. Mr. Frank Hall represented the secretaries and Mr. E. H. Francis the transfer secretaries.

In moving the adoption of the report and accounts the Chairman said: The quantity of ore crushed during the year amounted to 583,550 tons, being an increase on the previous year of 13,150 tons; the value of the gold recovered being 10.422dwt. in 1919. In common with other mines, working costs show an increase due principally to the increased cost of labour, contributions under the Miners' Phthisis Act, and the increased cost of gold realisation. A record working profit amounting to £964,883 was made during the year, which was £177,475 higher than the profit in 1919.

The dividends of 25 per cent. and 40 per cent., absorbing the sum of £777,980, were declared during the year, payable to shareholders registered at June 30 and December 31, 1920, respectively.

The capital expenditure during the year amounted to £16,484, and was spent principally on underground electric traction, extension of the plate house additional motor for the tube mills, and on a pipe line to the Apex pan, which was laid in order to ensure a sufficient water supply to the mine during the dry months of the year.

Increased Development.

The total development footage for the year amounted to 15,182 feet, an increase of 1,878 feet, as compared with 1919. The development of the western section of your mine, which had previously been somewhat neglected because the prospects were not considered promising, was renewed during the year with encouraging results, for although the value of the ore exposed is not high, it is payable, the reef widths are large, and it is expected that a considerable tonnage of ore will be obtainable from this section.

The ore reserves which were recalculated at the end of the year amounted to 3,260,000 tons, of an average value of 9.7 dwts., over a stoping width of 72 inches, which is an increase on the previous year, when the ore reserves were estimated at 3,200,000 tons, of an average value of 9.1dwts., over a stoping width of 72 inches.

With the increase in the area of the mine workings, the ventilation arrangements, which were quite adequate and satisfactory in past years, have now become insufficient, and it has been decided to instal a large fan at the east shaft, which will double the volume of air passing through the mine.

The crushing during the first four months of this year has been maintained at the average of last year, the tonnage crushed being 197,600 tons, or an average of 49,400 tons per month. The working costs show a slight increase, but it is hoped to effect a reduction under this head when the electric locomotive transport underground, at present being installed, is in operation. The working profit for the four months amounted to £285,070, which, owing to the reduced price received from the sale of gold, is lower than the average for the past year.

Steady Native Supply.

The supply of native labour was maintained throughout the year, the average number of natives employed underground being 2,913, as compared with 2,764 in 1919.

Since the introduction of the Transvaal Provincial Gold Profits Tax, the gold mining companies of this group have deducted the amount paid to the Transvaal Provincial Government from the amount of income taxable under the Income Tax Act of the Union. The Union Government disputed the companies' right to include this Provincial Taxation as a charge against their income, and, as mentioned at last year's annual meeting, brought a test case against this company, which was heard before the Special Income Tax Court, when judgment was given against the gold mining companies. This judgment has been appealed against, and the Special Income Tax Court is preparing the case to be submitted to the Supreme Court.

Mr. H. Mitchell assumed the management of your property on December 1, 1920, in place of Mr. Charles Marx, jun., who was transferred to another mine of the group.

In conclusion it may be said that the mine is in a very sound position, and the future prospects are satisfactory.

Before the adoption of the report Mr. E. R. Grant moved a vote of thanks to the chairman and his co-directors. He said he was prompted in doing so by the fact that the directors and officials of the Johannesburg Consolidated Investment Co., Ltd., stood in high repute in the matter of the management of the Barnato Group.

The motion for the adoption of the report and accounts was then put to the meeting, and carried unanimously.

The retiring directors, Messrs. S. B Joel and J. H. Crosby, were re-elected, and Messrs. Alex. Aiken and W. Fergusson were re-appointed auditors.

NEW STATE AREAS.

Nearing the Producing Stage.

The annual general meeting of the New State Areas, Ltd., held on May 27, in the Consolidated Buildings, was presided over by Mr. John Munro. There were also present Messrs. C. Marx, J. H. Crosby, J. F. Rutherford, W. M. Munro, G. J. Joel, A. Sprinz, A. Ravno, G. S. Kope, A. Lipman, E. R. Grant and F. Hilner. Mr. Frank Hall represented the secretaries and Mr. E. H. Francis the transfer secretaries.

In moving the adoption of the report and accounts Mr. Munro said: The work of sinking the two shafts on your mine is now completed, the south shaft having been sunk to a final depth of 4,071 feet and the north to a final depth of 3,768 feet.

The reef was intersected in the south shaft in October at a depth of 3,676 feet, and gave an average value of 89.8dwt. over 18.9in. The reef in the north shaft was intersected in December, but it was found to be faulted and disturbed by numerous quartz intrusions.

The work of cutting the two stations in the south shaft, one at the level of the reef and the other 200 feet below it, and the cutting of one station in the north shaft, is now completed. The connecting drive between the two shafts, and also a cross-cut to intersect the reef to the south from the bottom station at the south shaft, are being pushed forward and excellent progress is being made. Development work on the reef is now being started. The intermediate pump station is cut at the south shaft and it is expected to have a pump installed and working about the end of June.

Capital expenditure for the year, as fully detailed in the balance sheet, amounted to £243,766 19s. 4d., which was principally incurred in shaft sinking and cutting stations.

The question of the reduction plant is receiving very careful consideration, and, as soon as the development is sufficiently advanced, no time will be lost in bringing the property to the productive stage.

Questions Asked.

In reply to Mr. G. S. Kope, the chairman explained the method in which the Government's share of profits would be arrived at under the mineral lease giving several instances.

In reply to Mr. E. R. Grant, who desired information as to the development of the property, the chairman stated that the connecting drive between the two shafts was being pushed forward. The drive from the south shaft was on reef of excellent value, but the drive from the north shaft was being carried forward some depth under the reef, so that the drives would meet at the same level.

The motion for the adoption of the report and accounts, on being put to the meeting, was carried unanimously.

The retiring directors, Messrs. S. B. Joel and J. Munro, were re-elected, and Messrs. Alex. Aiken and Carter and E Danckwerts and Co. were re-appointed auditors.

GENERAL MINING GROUP.

WEST RAND CONSOLIDATED.

Mr. Leopold Albu, presiding in the absence of Sir George Albu, at the annual meeting of the West Rand Consolidated Mines, Ltd., said: In the face of the many difficulties which have been experienced during the year, and of the heavy increases in pay granted to whites and natives in terms of the recommendation of the Transvaal Chamber of Mines, it is satisfactory to note that the operations for the period ended in a working profit of £70,180, and that, after providing for interest on debentures, debenture trustees' fees, interest, South African income tax, and French taxes there remained a balance of £49,696.

On the other hand, debentures were redeemed to the extent of £24.990, and capital expenditure on shaft sinking, machinery and plant, and excess development absorbed £48.464, so that our cash position at December 31 last was unfavourably affected to the tune of £23,758. This position having been more or less anticipated, it appeared to be necessary, in order to meet the expenditure outlined at the last annual meeting, to call the meeting of debenture holders then referred to, and this meeting was held in London on September 23 last. Resolutions were passed agreeing to the suspension of payment of interest on and redemption of debentures for three years from the first day of that month, and granting a prior lien to the General Mining and Finance Corporation, Ltd., on the assets of the company against advances made or to be made by the corporation up to £100,000.

New Pumping Plant.

Owing to our having earned sufficient profit during the year, it has been possible so far to meet the cost of the new pumping plant and other items of equipment in the Battery reef section without negotiating a loan, although, in view of the serious fall in the price of gold which recently has taken place, without any corresponding reduction in working expenditure, it seems probable that the programme will be incapable of completion with the reserve at the company's command, and that in terms of our arrangement with the General Mining and Finance Corporation they will have to be approached in order to make up the deficit.

In comparison with the previous year's results, the ore crushed during the twelve months under review, at 378,100 tons, shows a slight increase. The recovery, at 6.276 dwts, remains practically unchanged, but, due to the higher price received for our gold, the revenue per ton shows an improvement of 6.66s. Working costs, which were higher by 3.67s., absorbed a proportion of this increased revenue, and the balance went to make up the higher scale of profits earned during the period.

The new pumping plant, which was ordered by the company something like three years ago, has at last arrived on the property, and is being installed. As soon as this plant is working, steps will be taken to unwater the lower portion of the east and west shafts in the Main Reef section, which have been flooded for several years, and to resume shaft sinking and development at these points, with the object of improving the position of the ore reserve.

The Year's Work.

Full details of the work carried out during the year are given in the annual report of your manager. This report shows that the total footage of development accomplished was 13.105 feet, as compared with 13,153 feet during the previous year. The ore disclosed by the drives included in this footage was 231,195 tons, of which 46.8 per cent. indicated payable values. The ore reserve, as calculated by your manager, basing the pay limit on a price for gold of 110s. per fine ounce, was estimated to consist of 1,205,199 tons, of an average value of 6.5 dwts. over 49 inches. This tonnace has beenreduced to some extent, since the beginning of the year, owing to the fall in the price of gold, but I need hardly say that a reduction in working costs would reinstate much of it within the payable category.

Reduction in Price of Gold.

To bring the position more nearly up to date, I may mention that, following upon the reduction in the price of gold, a substantial decrease in the profit-earning capacity of the mine has taken place since the commencement of the current year, the profit having fallen from £8,000 per month, which was the figure at the end of 1920, to £4.000 in April last. The approximate production of gold by the West Rand Consoliated Mines is 9,500ozs. per month. It does not require much imagination, therefore, to see that a comparatively small further decrease in the price of gold will absorb the existing scale of profits. Should this position come to pass, and in order to avoid the suspension of operations, it will clearly be necessary to reduce the present scale of working expenditure, and this can be brought about only if the men will agree to accept a reduction in the present amount of their cost of living allowance.

In conclusion, it gives me much pleasure to express on behalf of the board their appreciation of the services of your technical adviser, Mr. Erroll Hay, and of your manager, Mr. G. D. Stephen, to whom, as well as to the officials and staff on the mine, our thanks are due for the conscientious manner in which they have carried out the arduous duties devolving upon them during a trying year.

The report and accounts were adopted.

ROODEPOORT-UNITED.

Mr. Leopold Albu, in the absence of Sir George Albu, presided at the annual general meeting of the shareholders of the Rooderpoort United Main Reef Gold Mining Co., Ltd., held in the board room, General Mining Buildings.

In addressing the meeting, Mr. Albu said:—

The critical position of your company's affairs was dealt with fully in the remarks from the chair at the previous annual meeting. It was pointed out at the time by your chairman that, quite apart from the fact that the working during 1919 resulted in a loss of £2.118, the heavy increases in pay granted to white and native employes in accordance with the recommendation of the Chamber of Mines, the fall in the price of gold and the high bank rate of exchange, made it impossible to continue operations on the then existing basis—the first four months of 1920 having resulted in a gross loss of £12,112, exclusive of the additional charge for interest on loans. You were informed, therefore, that in order to avoid immediate suspension of operations, it had been decided to adopt a scheme whereby 52 of the white employes were to be retrenched, and the mine kept running by the remainder for a few months longer, prior to closing down.

The Retrenchment Schemes.

This scheme was brought into effect during June of the year under review, and the loss for that month was substantially less in comparison with previous results. In July the full benefit of the retrenchment scheme began to make itself felt, and the month's work resulted in a profit of £1.516. Thereafter, up to the end of the year, the mine earned moderate profits, partly due to the effect of the retrenchment scheme, but also contributed to by the higher price which we obtained for our gold, and as a result, the loan from the General Mining and Finance Corporation, Ltd., was reduced from £387,405, which was the figure at the end of 1919, to £365,782 at the close of 1920. Unfortunately, at the beginning of 1921 a substantial drop took place in the price of gold, which necessitated our declaring the January output at 105s. per fine ounce, and in consequence the month's work resulted in a loss of £1.440. During February gold fell still further, with the result that the declaration for that month had to be made on the basis of 103s. 9d. per fine ounce, and the month's work showed a loss of £2,279. Since that date, the monthly losses have been £3,170 for March, and £1,819 for April.

The Position Serious.

It scarcely requires me to emphasise the seriousness of the position in which the mine has been placed by this fall in the price of gold—the figures which I have just given you indicate more clearly than any words of mine can do that it is hopeless to continue operations under present conditions. In consequence, I find it necessary to warn you that, unless some unforeseen relief is available in the very near future, there will be no alternative but to suspend operations.

We have, as you know, striven for many years to avoid this state of affairs, and we have been assisted very largely in so doing by the advances which we have obtained from the General Mining and Finance Corporation, Ltd. One hears, from time to time, criticisms levelled by certain sections of the community at the group system of controlling the mines on these fields. I claim that it is a testimony to the enormous advantage of this system that the Roodepoort United mine has been able to carry on in the face of overwhelming difficulties over such a long period, and I also claim that, but for the group system of control, the mine would have closed down many years ago, instead of having provided work for an average number of 200 to 250 white men, and, indirectly, having been a valuable asset to the State and the community as a whole.

No Government Assistance.

One would have thought that, in view of the critical stage through which the mines have been passing during the last few years, some assistance might have been expected from the Government of the country. Unfortunately, this hope has been in vain.

At a critical period in the Industry's affairs the new Miners' Phthisis Compensation Act was passed, under which the amount payable by your Company for compensation rose during the past year to very nearly £700 per month. Within the last few months we have received instructions from the Native Affairs Department that our scale of native feeding, which I claim, without fear of contradiction, is exceptionally good, has to be increased to an extent which will cost this mine an additional £320 per month. Over and above this, the mine has had to suffer for years from shortage of native labour, due to the refusal of the Government to allow the Industry to import labour from so-called tropical areas. You will remember that, towards the middle of 1919, the Government appointed a Commission to inquire into the position of the Low Grade Mines, and the best means of assisting them out of their difficulties. The interim report of this Commission was published in September of the same year, and was followed by a final report in April 1920, but apparently the Government, in its wisdom, has seen fit to turn down every single one of the many valuable recommendations made by this Commission, with the exception of a minor suggestion in regard to the formation of Workmen's Committees on the mines.

Commission's Report Disregarded.

Within the past few months another Commission, he proceeded, appointed by the Government to investigate the causes of unemployment in the country, and the best means of overcoming them, has issued its interim report. Its recommendations, to sum them up in a few words, are to the effect that the best way of avoiding serious unemployment would be ot adopt the recommendations of the Low Grade Mines Commission. One can only speculate how many more Government Commissions will be necessary before the seriousness of the present position is impressed upon the Government and before some definite action is taken by them to assist the low grade mines in their struggle to continue operations. It is no charity that we ask from the Government; as a matter of fact they stand to lose far more than we do if the mine closes down, and the appeals for assistance which we make, and have made for some time past, have been put forward not only with the object of assisting the Roodepoort United Mine, but also in the hope of avoiding a calamity to the community in general.

Dependent on the Industry.

It has been shown that, in this country, for every white man directly supported by the Industry, nine other whites, men, women and children, are indirectly supported. Of course, these figures cannot be applied to every individual man, or to each individual mine but, broadly speaking, they are correct, and on this basis it means that, should the Roodepoort United Mine, which employs at the present time 165 white men, close down, something like 1,650 whites would be deprived of their means of livelihood. One need hardly labour the seriousness of the situation. As you are aware, this mine is not the only one in a position of difficulty and on the verge of suspending operations, and I say to you to-day that, in my opinion, unless the Government of the country comes to the relief of the low grade mines in the very near future, so many of them will have to suspend operations that the country will have a set-back from which it will not recover for many years.

(Continued at foot of next column.)

The Bright Spot.

One bright spot on the horizon which I might mention is that the attitude of our men has been distinctly more reasonable since the retrenchment scheme was inaugurated, and it is a tribute to their good sense that during last February, when so many of the miners on the Witwatersrand were pulled out on strike by the extremist section of the Union, and against the advice of their leaders, the Roodepoort United men remained at work, knowing full well that, had a strike taken place on that property, the mine would have closed down immediately.

Well, gentlemen, I have dealt at some length with the critical position of the company, and I have emphasised the need for immediate assistance from the Government, if we are to carry on. One knows, however, that the speed of the Government in dealing with these matters is slow, even if their perception be great, and it is quite evident that, if we have to wait for the reports of two or three more Commissions before steps are taken to alleviate the position of the low grade mines, we might as well close down immediately.

One Chance of Keeping Going.

There is, however, one chance which might enable us to keep going in the meantime, and that is if the men, who have received a very substantial increase in pay since the commencement of the war, will agree to forgo at any rate the greater portion of this increase. I am somewhat diffident in putting forward a suggestion of this nature, but I would point out that, if they agree to do so, the advantage will lie more with them than with the company, since the amount which could be saved, even if the cost of living allowance were to be abolished entirely, would be barely sufficient to cover the existing losses. We have not approached our men in this direction up to the present time, since I do not believe that the position would be eased by reducing the rate of pay on the Roodepoort United alone. Unless such a reduction were generally adopted on the Rand, it would simply mean that our skilled men would drift elsewhere, we should be unable to replace them with suitable substitutes, and, as a result, the efficiency of the mine would decrease, and we should be even worse off than we were before.

In conclusion, I want to record your board's sincere appreciation of the services rendered by your technical adviser, Mr. Erroll Hay, your manager, Mr. C. S. McLean, and the officials and men working under their supervision. The manner in which the retrenchment scheme was taken up, and the success which attended its adoption, reflects credit on all concerned, and in congratulating them on the results so far obtained, I wish to express the hope that, through some miracle not yet apparent, I shall be in a position to voice our further appreciation of their services at the next annual meeting.

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AURORA WEST.

Shareholders in the Aurora West United Gold Mining Company met at the annual general meeting held in the board room, General Mining Buildings. In the absence of Sir Geo. Albu, Mr. Leopold Albu presided, and in the course of his remarks, said:

At the last annual meeting the unsatisfactory position of your company was indicated to you by the chairman, and it was shown clearly that to continue working the mine on the former basis of operations was altogether out of the question, owing chiefly to the abnormally high cost of stores and labour.

It was further stated that work during the first few months of the year under review had resulted in substantial losses, and that, as an alternative to the total suspension of operations, it was proposed to inaugurate a policy of selective mining and to endeavour to work the property with a reduced complement of white labour.

Fortunately, this policy has proved successful, and, in comparison with the working loss of approximately £7,500, which occurred during 1919, the year's work has resulted in a gross profit, after deducting the losses during the earlier months of the year, and in spite of the considerable increases in pay to both white and native employes, granted through the agency of the Chamber of Mines, of £5,667. This, after providing for interest on the loan, left a net profit of £2,878 towards reduction of the company's liability to the General Mining and Finance Corporation, Ltd., which at the end of the year stood at £21,584.

In considering the above result, which I think you will agree is a cause for congratulation, one must not lose sight of the fact that, although the reorganisation and retrenchment scheme which was brought into effect undoubtedly assisted the position materially, we were also helped to a very great extent by the substantial increase in the price of gold, combined with more favourable rates of exchange, which went consistently in our favour until the end of the year.

The Strike Loss.

To bring the position more up-to-date, the appreciable drop in the price of gold which occurred in January was immediately reflected by that month's results showing a loss of £683, and this was followed in February by a further loss of £2,195, due to an unauthorised strike of underground workmen which affected the majority of the mines on the Rand.

Since that date small profits have been earned by the company, of £264 in March and £661 in April, but I would emphasise that the maintenance of even this nominal scale of earnings is entirely dependent upon the future price of gold, and that the outlook in this direction at the present time is far from satisfactory. On the basis of last month's operations, the cost of producing an ounce of gold was 98s., in comparison with the existing price of gold, which is rather less than 103s.

This shows that the margin of profit now remaining, even on the comparatively favourable April figures, is very small indeed: and the recent increase of ¼ per cent. in the bank rate of exchange, which costs the company over £100 extra per month, does not tend to ease the position. It follows, therefore, that the present situation is exceedingly critical, and that a very slight further decrease in the price of gold or increase in the exchange rate would have the effect of absorbing the nominal profit now being realised, in which event it is obvious either that the mine must obtain relief in some direction or else follow the natural course of unpayable industrial concerns, and close down.

Quite apart from the fact that, once closed, it is improbable that the mine would ever be reopened, to suspend operations at the present time, when unemployment is rife throughout the country, would be a most unfortunate step to take, and we have no intention of adopting such a course until we have exhausted every possible expedient.

The price of gold is a factor which we cannot control, since it is governed mainly by the position of international exchange and finance. Consequently, whatever relief is to be obtained must be brought about by reducing working expenditure. Here again we are limited in our sphere of action. Economies in labour and stores, since the inauguration of the retrenchment scheme, have been carried to their limit, the cost of supplies is out of our control, and there is no margin for reducing the present scale of native wages.

Only One Course Open.

It is evident, therefore, that the only avenue of economy open to us lies in a reduction of the existing cost of living allowance granted to our white employes since the commencement of the war. I am somewhat averse to making suggestions of this nature, but I think you will agree that if, under the conditions of unemployment now prevailing in this country, the position were allowed to become accentuated by mines closing down on account of their being compelled to pay excessive wages it would be a most unfortunate error, and one which would affect the workman himself more than any other class of the community.

I have heard it sugested that it might be possible to arrange for the employes on certain of the low grade mines to accept lower wages in order to avoid the closing of these properties, but a close consideration of such a proposal shows its impracticability. Take our own case. Suppose we were, by arrangement with our men, to reduce the scale of wages on the Aurora West mine, without a similar reduction being brought about on the other mines of the Rand. What would happen? It seems to me obvious that all our skilled workers immediately would seek more remunerative employment on properties where the pay had not been reduced—it would be only human nature if they did so—and that we should have nothing left but a residue of inefficients.

In such circumstances it would be clearly hopeless for the mine to continue operations, and for this reason we have not suggested any such scheme to our men. It may be argued that if the low grade mines generally were to reduce their scale of white pay the large number of men affected would be unable to find employment at higher rates on other mines. This may be true so far as the near future is concerned, but in the long run the mines paying the highest wages would have the best men, and the low grade mines, to whom efficiency is vitally necessary for their existence, would be even worse off than under present conditions. It naturally follows that, whatever reduction in wages is to be effected—and if we are to save a large proportion of the white inhabitants of this country from future misery and starvation it must be taken in hand at once—must be general. It is to be hoped for the sake of all concerned, and most particularly for their own sakes, that the men will realise this position and acvept the inevitable before it is too late.

Continued Development.

Turning to the more technical side of the company's affairs, development on the 15th level has been fully up to our expectations, and every effort is being made at the present time to push this work ahead, so as to compensate for the elimination of payable stope faces in the upper levels, due either to their being worked out or having become unpayable owing to the higher scale of working expenditure.

In regard to the future, I scarcely like to make any prediction. If we can survive the existing critical period it seems probable that the mine will continue operations for a few more years; but, if not, it may be that we shall be forced to close down before our next annual meeting. Much depends upon the attitude of the men and their leaders towards the reduction in wages which inevitably must be brought about if the low grade mines are to continue operations. In this connection I feel impelled to refer to the recent unwarranted and unauthorised strike of underground workmen, which occurred in February of this year. I am in full sympathy with the legitimate trade union movement which has come prominently into being during the last few years, and I bear no ill-will either to the men or their organisations. At the same time, I cannot too strongly condemn the irresponsible action of a certain section of the men who, against the instructions of their leaders and by the use of threats and intimidation, caused strikes on mines like the Aurora West.

Extremists Who Defy Leaders.

Episodes of this sort make one feel the hopelessness of entering into agreements with the trade union leaders, and it must be galling to those leaders themselves to find that the undertakings made by them, in all good faith, on behalf of the men are dishonourably repudiated on every possible opportunity by an extremist section who are too brainless to see that they are dealing a blow to the trade union movement and too irresponsible to realise that they are endangering the livelihood of those they call their friends.

In conclusion, I desire to express the board's sincere appreciation of the valuable work carried out by your technical adviser, Mr. Erroll Hay, and by your manager, Mr. A. Rose Innes. Mr. Rose-Innes has had a trying year and has been faced with many difficulties and drawbacks, which in the main, have been successfully overcome. I also wish to record our appreciation of the attitude of the officials and workmen on the mine, all of whom have supported the company loyally in the struggle to avoid closing down. They are to be congratulated on the fact that their efforts have been responsible to a large extent for the continuation of operations, and it is to be hoped that this attitude will prevail during the current and ensuing years, so that the mine may continue to be, if not a valuable asset to shareholders, at any rate of assistance to the white community of this country as a whole.

The adoption of the report was unanimously agreed to, and the meeting terminated.

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THE NEW GOCH.

The annual general meeting of shareholders in the New Goch Gold Mines, Ltd., was presided over by Mr. Leopold Albu.

The Chairman, in addressing those present, said: Although the results for the period under review can scarcely be described as prosperous, it must be considered highly satisfactory that, in spite of all the drawbacks and disabilities which the past few years have brought in their train, the mine has been able to keep its head above water for still another year, and that operations, instead of showing a loss as might have been expected, actually resulted in a small profit of £7,231.

This is all the more encouraging when it is borne in mind that the first four months' work showed a loss of no less than £12,925, and that the revenue earned during the subsequent eight months of the year not only compensated for this loss and provided for the total cost of shaft sinking and development formerly charged to City Deep development suspense account, but also left on balance the profit already referred to.

This comparatively satisfactory state of affairs is, of course, due largely to the retrenchment scheme introduced on the mine during May, when, by arrangement with the various unions concerned, approximately one-third of the white labour force was retrenched, and arrangements were made under which the mine was kept running with the remainder.

That this experiment has proved successful redounds greatly to the credit of the management, officials and men, and is a tribute to the commonsense displayed by the leaders of the various unions, who realised that the scheme was a genuine attempt to avoid closing down, thereby throwing their members out of employment, and who therefore assisted us in carrying it out. It also affords a valuable lesson regarding the importance of co-operation between all employes on the mine.

But for this I have no hesitation in saying that it would have been a matter of entire impossibility to have survived the difficulties of the past year, and it is beyond doubt that by this time the company would have suspended operations. From the shareholders' point of view this would have meant converting what is still a live, if not a particularly vigorous asset, into a derelict concern; and, from the employes' standpoint, a source of employment for some 116 men which otherwise would have been non-existent, is still available.

I cannot help emphasising this point—the continuation of operations has been rendered possible only by mutual co-operation, and I feel that if this spirit could be more readily maintained throughout the industry generally, the danger of low-grade mines closing, with the resultant disastrous effect upon the employes and the country in general, would be far less serious than it is to-day.

Ore That Has Become Unpayable.

Quite apart from the continuance of mining operations, the improved outlook since the introduction of the retrenchment scheme justified our carrying on the programme for development of the City Deep claims. The total footage accomplished in this area, where the bulk of our intact ore lies, was 4,875 feet; the footage in the New Goch claims, where development is practically completed, being 303 feet. In all a sum of nearly £29,000 was expended on shaft sinking and development during the year, the quantity of payable ore developed by this footage being 73,745 tons.

In view of this, it may appear surprising that the ore reserve, basing the pay limit on a price of 110s. for gold (the price prevailing at the end of the year), shows quite a substantial increase. This, of course, is due to the rise in working costs which has taken place, owing largely to the heavy increases in white and native pay which were granted early in 1920. The resultant advance in costs, amounting roughly to four shillings per ton milled, has necessitated our raising the limit of payability, and certain large blocks of ore, formerly payable, now have to be relegated, for the time being at any rate, to the category of unpayable ore.

Strike Wipes Out Profits.

There is one point to which I must draw attention in considering the future of the property, and that is the recent fall in the price of gold, which, since the end of last year, has dropped from over 118s. to below 103s. per fine ounce. In consequence of this the results for the current year have suffered considerably. In January the mine earned a profit of £823; in February, due to an unauthorised strike of underground workmen, the substantial loss of £2,303 was incurred; and the months of March and April showed profits, respectively, of £873 and £854.

From this you will see that our remaining margin of profit is very small indeed; in fact, if we take last month as a basis, the profit would have been non-existent had we declared the gold at 101s. 3d. instead of at 103s. 9d., which was the figure taken. The present price of gold is below 103s., and seems steadily to be diminishing.

What the future holds no one can say. There can be do doubt that the outlook for the current year is far from favourable; still, it does not do to be unduly pessimistic. At the moment we are out of debt, and, although the margin of profit is small, we are still making revenue balance expenditure. That is as much as we can hope to do under present conditions. Should the price of gold fall still further, we should no longer be able to balance expenditure, and the question of further economies would arise.

Will the Workers Agree?

We cannot expect to save appreciably by further retrenchment of white employees, native wages are scarcely capable of reduction, and the cost of stores is out of our control; it follows, therefore, that the only alternative to closing down might be for the men to forego at any rate a substantial proportion of the cost of living allowance granted to them since the commencement of the war.

Whether they will be ready to so I am not prepared to say. Knowing what I do of the workmen on these fields, I feel that, although such a step would be opposed by the irresponsibles, there is a large section of reasonable, thinking men who will understand and appreciate the position, and who will see that the only alternative to a suspension of operations, not only of this mine, but on many others, and to the unemployment which such a position would bring about, would be for them to accept a lower rate of wages.

Let me make myself quite clear on this point. We have no intention whatever of closing down this or any other mine of the group while revenue balances expenditure, but we are not prepared to face continued losses without prospect of their recovery.

In conclusion, I wish once more to express your Board's sincere appreciation of the work carried out by your technical adviser, Mr. Erroll Hay, and your manager, Mr. Robt. Parker, and the officials and men under his supervision. It must be a source of gratification to every one of them that, by their efforts and the avoidance of trouble on the mine, they have been able to continue operations, if not with great advantage to the shareholders, at any rate with benefit to themselves and the community in general, for another year.

I only hope that, as the result of the increased effort which will be necessary during the remainder of this year, I shall be able to tell you at the next annual meeting that the mine is still continuing operations, and I look to our employes to do everything possible, for their own sakes if not for ours, to attain this end.

Having moved the adoption of the report, which was seconded in due course, the resolution was unanimously agreed to by the meeting.

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MEYER AND CHARLTON.

At the annual meeting of the Meyer and Charlton Gold Mine, Ltd., held in the board-room of the General Mining and Finance Buildings, Mr. Leopold Albu in moving the adoption of the report and balance sheet said: The record of the company for the past year had been one of unequalled prosperity, the gross profit of £364.033 being the largest earned in the history of the mine. This position, of course, was contributed to largely by the higher prices which they were able to obtain for their product and by the favourable bank rate of exchange during the latter part of the year. After allowing for income and dividend tax plus the Union Government's share of profits, amounting in all to £76.519, and providing £10,746 for the assessment made by the Provincial Council of the Transvaal, and also for English income tax, French taxes and capital expenditure, the available net profit for the year was £266.498. Two dividends aggregating 120 per cent. were declared, equal to a total distribution of £240.000 for the period in question, and £26.498, representing unappropriated profit for the year, together with £135.171, being the balance brought forward from 1919, amounting in all to £161,669, was carried forward.

The ore crushed showed a slight decrease of 5,137 tons as compared with that milled during the preceding twelve months. On the other hand, owing to the higher price obtained for their gold, the revenue per ton, at 70.82 shillings, exhibited an improvement of 7.66 shillings. This was sufficient not only to compensate for the smaller tonnage milled and an increase of 3.15 shillings in the working costs (due to the advance in wages granted to white and native employes), but also to improve the gross profit, in comparison with the previous year's return, by £31,666.

Full details of the work were given in the manager's report, and it was of interest to note that, in spite of the improved profits, the quantity of the rich main reef leader mined, at 80,956 tons, was less by 9.954 tons than than mined during 1919, while the ore obtained from reclamation increased to 54,555 tons, representing 33½ per cent. of the total ore mined. The fact of their obtaining such a high proportion of ore from reclamation in the old workings was naturally of the greatest importance to the company, since it enabled them gradually to reduce the quantity of ore drawn from the main reef leader stopes, thereby prolonging substantially the working life of the mine.

During the year 19.335 tons of reef was packed underground in the stopes, as against 14,532 tons, which was withdrawn from the old packs. The quantity of ore temporarily absorbed in that manner showed a substantial reduction in comparison with previous years, due to the more extended use of sand for support of the underground workings.

The ore reserve was given in the manager's report at 450.050 tons of ore, of an average grade of 14.1dwt. over the stoping width, of which 403.118 tons represented the main reef leader, estimated to have a stoping value of 14.9 dwt. The position in regard to ore reserve was, therefore, highly satisfactory. They would see, on reference to the manager's report, that although not more than 248 feet of driving was carried out during the year, the ore reserve was depleted to the extent of only 66.439 tons, in spite of the fact that the total ore mined was over 165.000 tons. This was in consequence of the large tonnage obtained from reclamation rock, for which no credit was taken in their ore reserves, and the inclusion of certain blocks of ore between the 21st and 22nd levels, which, though below the average value of the main reef leader, are nevertheless payable under present conditions of working.

To bring the position up to date, the working profits declared for the four months ended April 30 last amounted to £88.500. This was below last year's average, owing partly to the lower price obtained for their gold since the commencement of the year, and partly to an unwarranted and unauthorised strike of the underground workmen which, under compulsion from the extremist element among strikers from other mines, took place during February, and materially affected profits for that month.

In conclusion, he expressed their sincere appreciation of the work of their technical adviser, Mr. Erroll Hay, and of the manager, Mr. H. Johnston during the past year. It was due in no small measure to their investigations in the old workings and close supervision of underground details, that they had been able to maintain the existing high scale of profits, and at the same time to encroach to a lesser extent upon the valuable ore reserves on the main reef leader.

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THE CINDERELLA.

At the annual general meeting of the shareholders in the Cinderella Consolidated Gold Mines, Ltd., Mr. Leopold Albu presided in the absence of Sir George Albu. The proceedings took place in the board-room, General Mining Buildings. Mr. Albu, in addressing the shareholders, said:

From a perusal of the accounts for the year under review, you will notice that the expenditure amounted to £10 489, the bulk of which, as in the past few years, represents payment of licences and mynpacht dues, plus the necessary expenditure for the upkeep of your property.

The total outgoings exceeded by £590 the figure for the previous year, the increase being entirely in the cost of maintenance, which was affected by the higher scale of wages in force in 1920, and in fairly extensive repairs and painting which were found to be necessary in order to keep the buildings in good condition.

This was fortunately more than covered by the increase in rents, interest, etc., which at £3,856 show an advance of £785 on the total for 1919, due to an arrangement by which the Provincial Administration of the Transvaal became tenants of our workshops and certain other vacant buildings at a rental of £55 per month, in order to establish a trades school for the East Rand.

The net expenditure for the year therefore amounted to £6,633, but as we were able to sell non-essential plant and stores to the value of £5,815, the cash position was only affected to the extent of £818. The actual cash on hand at the end of the year was £16,539.

As you are aware, payment of redemption and interest on the debenture issue of £500,000 was deferred until the expiration of twelve months from the signing of peace between Great Britain and the nations with which she was at war on November 26, 1914.

Owing to the aftermath of the war it has unfortunately been impossible to make any satisfactory arrangement whereby these payments can be resumed, and under existing circumstances there seems to be no other course open than to obtain a further extension of time.

It has accordingly been arranged to hold a meeting of debenture-holders in London in the near future, in order to secure their consent to the suspension of the debenture service for an additional period of three years.

A Note of Hope.

In considering the existing position of your company, there is but little to add to the remarks of your chairman at the previous meeting in regard to the possibility of resuming operations at the mine. The present time, as you are aware, is most unfavourable for raising fresh capital for ventures of almost any description, and particularly does this apply to our gold mines, owing to the ever-increasing cost of labour and supplies during the past few years, and, more recently, to the rapid fall in the price of gold, which has, without doubt, caused gold mining stocks to be regarded with a certain amount of suspicion.

Nevertheless, I cannot help thinking that the present position of the world, and the shortage of capital for new ventures, is only temporary, and, while it is obviously impossible to make any definite prediction, I am of the opinion that, with the eventual return to more normal working conditions the question of obtaining fresh capital for the company will not present the same difficulty as it does to-day.

Properties Amalgamation.

It will doubtless be of interest to you to know that within the last month or two the Government appointed a committee of engineers to consider ways and means to avoid the closing down of our neighbour, the East Rand Proprietary Mines, Limited, and that the suggestions which were favoured in the majority report of the committee included, inter alia, one to the effect that working arrangements should be made by the East Rand Proprietary Mines, Ltd., and the Cinderella Consolidated Gold Mines, Ltd., to run the two properties as one joint concern.

In dealing with this suggestion I may say that, while we are anxious to give the East Rand Proprietary Mines every assistance in our power to help them out of their difficulties, from our own personal point of view it would be more satisfactory to wait for a resumption of operations until such time as the Cinderalla Consolidated was able to arrange its own finances, so that the mine might be run as an independent unit.

In this connection, I may remind you that during the period 1908 to 1913 inclusive, when your company was crushing, the average yield per ton was 27s. 9d., which, at to-day's price for gold, would be equivalent to 33s. 6d. Not only this, but the profit earned during the above period was in the neighbourhood of 4s. per ton, and this in spite of the fact that working costs were altogether abnormal, due to our working on a very small scale and with only one outlet to the mine. Under more normal circumstances, and when connection had been made with the central shaft, these drawbacks would disappear, and it is evident that, after conditions in regard to labour and the price of stores became more favourable, the future prospects for the mine would be substantially better than the past results indicate.

At the same time, however, we have no wish to see the East Rand Proprietary Mines closed down, and, since the committee of engineers is of opinion that such a position might be saved by an amalgamation with the Cinderella, we are perfectly prepared to consider any reasonable proposals which the E.R.P.M. may wish to make, and to assist, so far as we are able, in averting the calamity which threatens the whole district in the event of their suspending operations.

The resolution having been seconded and unanimously adopted, the proceedings terminated.

NEW GEDULD DEEP.

The annual general meeting of shareholders in the New Geduld Deep, Ltd., was held in the board room, Stock Exchange Buildings. The meeting was presided over by Mr. E. Mansfield, chairman and managing director, who in opening the proceedings said:—

From the report and accounts submitted you will gather than 1920 has been a quiet period in your company's affairs. As practically all the stands in Geduld Township had been sold by the end of 1919, our main business during the year has been the collection of instalments due on previous sales and on mortgage bonds account. In consequence, no doubt, of the general depression the rate of reduction in amounts owing to the company has not been as brisk as formerly. However, it is satisfactory to be able to report that during the year under review outstandings have been reduced by more than half, and it is pretty certain that there will be little, if any, loss on the remainder.

The principal item of revenue this year is, interest £1,456 4s., which is about £500 less than last year, owing to the dividends having reduced our cash assets. The amount of £359 17s., under head of "owner's share of claim licences," covers the period 1918 to 1920, and accrues to the company in respect of claims being worked underneath Geduld Township.

The total expenditure for the year has been £1,779, as compared with £3,287 in 1919—a decrease of nearly 50 per cent. Administration costs for the current year will show a further saving.

On the subject of the company's prospects I can scarcely add anything useful to my remarks at last year's meeting. You are aware that the board is endeavouring to get an extension of the township to cover the two mynpacht areas of which we own the freehold, but the underlying mineral rights belong to the Government and our application for township rights is delayed until the Mines Department is in a position to say that no portion of the surface may be required for mining purposes. As soon as these areas are absorbed, either by an adjoining mine or in a lease of the Government claims on Eastern Geduld, we hope to be able to go ahead and turn our freehold rights to advantage by establishing a new township linked up with the existing townships of Springs and Geduld.

Our cash resources are practically unchanged from last year. The total issued capital of the company is represented by cash assets averaging just over 2s. a share.

I now beg formally to move the adoption of the report and accounts.

After being seconded the adoption of the report was unanimously carried.

NEW COMPANY REGISTRATIONS.

The list of companies registered in April, 1921, is as follows:—.

S. L. Lyons, Ltd.; capital £2,750.
Du Boulay and Brown, Ltd.; capital £3,500
Mann, Little & Company (South African, Ltd.; capital £50,000
Goldmann and Klavansky, Ltd.; capital £500.
William Johnston, Ltd.; capital £25,000.
New Deep Water Diamonds, Ltd.; capital £10,000.
Gold and Base Metal Concentrating Company, Ltd.; capital £1,560.
South African Coal Estates (Witbank), Ltd.; capital £1,000,000.
Transvaal Boot Factory, Ltd.; capital £300.
The Germiston Mineral Water Works, Ltd.; capital £2,000.
Scotts Jame, Ltd.; capital £5,000.
Springs Racing Club, Ltd.; capital £30,000.
Lemon Krush Company, Ltd.; capital £5,000.
Burrows, Ltd.; £5,000.
Orkin Bros. (Johannesburg), Ltd.; capital £5,000.
B. J. Penney, Ltd.; capital £85,000.
Newtown Tin Manufacturers, Ltd.; capital £5,000.
Payne Brothers, Ltd.; capital £10,000.
Schneier & London, Ltd.; capital £50,000.
Turkstra, Ltd.; capital £2,000.
South African Federated Chamber of Industries, Incorporated; capital £100.
Polar Bear Paint Company, Ltd.; capital £600.

FOREIGN COMPANIES.

Durant Radford & Company, Ltd.; capital £100,000.
General Motor Export Company, Ltd.; 1,000,000 dollars.
Ajax, Ltd.; capital £2,500.
African Theatres, Ltd.; capital £500,000.

NOTICES OF INCREASE OF CAPITAL.

Southern Coal Company, Ltd., increased from £6,000 to £12,000.
Premier Paper Mills, Ltd., increased from £30,000 to £40,000.
Moseley Buildings, Ltd., increased from £32,000 to £72,000.
Lometi Estates, Ltd., increased from £30,000 to £60,000.
Mendelsohn, Ltd., increased from £1,000 to £2,000.
Transvaal Silver and Base Metals, Ltd., increased from £139,920 to £300,000.
Knights Co-operative Stores, Ltd., increased from £200 to £1,000.
Barry Colne & Company (Transvaal), Ltd., increased from £250 to £10,000.

RAND WATER BOARD
(6 per cent.) STOCK, 1950.

(Issued by the Rand Water Board under powers conferred by Act No. 18 of 1914 (South Africa), and subject to the provisions of the Board's Statutes.)

PRINCIPAL repayable at par on the 30th June, 1950.
ISSUE PRICE; £97 10s. 0d. per £100 Stock.
INTEREST at 6 per cent. per annum, payable half yearly, on the 1st January and the 1st July in each year.

NOTICE IS HEREBY GIVEN that the SUBSCRIPTION LISTS of the above-mentioned Stock will be closed on the 30th June, 1921.

In terms of the Prospectus, dated 18th June, 1920, the final instalments in respect of allotments of Stock not yet paid for in full become due and payable to the Board not later than the 30th June, 1921.

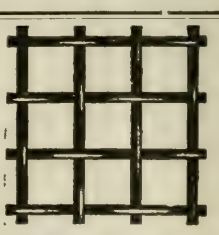
J. H. STEVENSON,
Secretary and Treasurer to the Board.

26th May, 1921.

PROSPECTUS AND FORM OF APPLICATION and any further information which may be required regarding this issue of Stock can be obtained from the Secretary, Rand Water Board, P.O. Box [illegible], Johannesburg, or at any Branch of the National Bank of South Africa, Limited, and the Standard Bank of South Africa, Limited.

SCREENING

Order No	Gauge	Space, inch.
S2031	20	
S2032	18	
S2033	16	
S2034	15	3/8
S2035	14	
S2036	12	
S2037	10	



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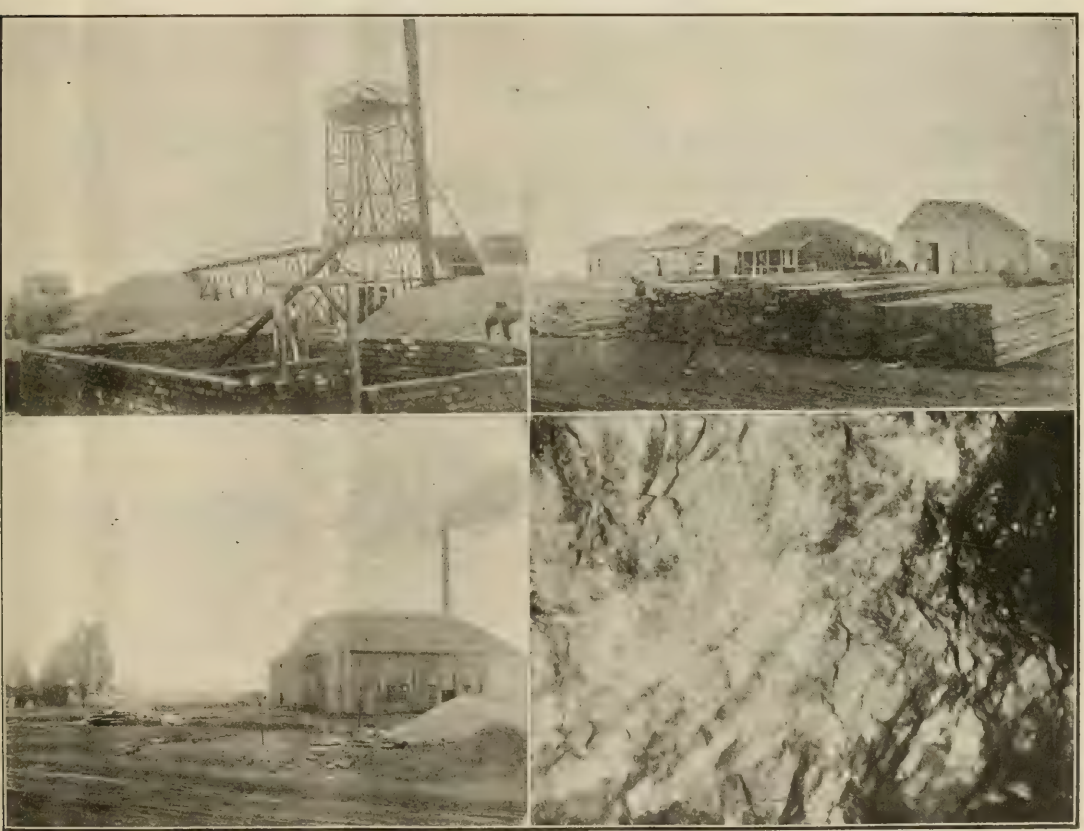
Established 1891.

Vol. XXXI., Part I. JOHANNESBURG, TRANSVAAL, SATURDAY, JUNE 11, 1921. No. 1550.

Scenes at the Transvaal Silver and Base Metals.



The quartette of photos, which have been specially taken for this journal, appearing above, illustrate an interesting article on this property, which is contained elsewhere in this issue. The photos are: Figure IV. (top left-hand corner), Headgear at No. 1 shaft. Figure II. (top right-hand corner), Some of the Buildings and Offices. Figure V. (bottom left-hand corner), Compressor and Power Plant Building. Figure VI. (bottom right-hand corner), Galena Siderite Vein, as seen in a drive in the No. 1 Shaft.

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Transvaal Silver and Base Metals, Limited.

A CAREFUL EXAMINATION OF THE TECHNOLOGY AND PROSPECTS OF AN INTERESTING VENTURE.

By a Special Technical Commissioner of the "S.A. Mining and Engineering Journal."

PART I.

It is no exaggeration to say that few if any Transvaal mining flotations of the last two years have engaged so much local attention as has the successful flotation sponsored by the General Mining and Finance Corporation and known as Transvaal Silver and Base Metals. Through the courtesy of the company we have recently made a thorough investigation into the proposition, and the following account of our Special Commissioner's examination will be read with great interest by many readers.

Our Commissioner has done his work thoroughly and well, and as his report is a lengthy one we are reproducing this valuable article in two portions. The second and final instalment will appear in our next week's issue.

The farm Dwarsfontein, on which property the most important lodes of the Transvaal Silver and Base Metals, Limited, are situated, lies in the vicinity of Argent, a station on the Springs-Witbank line. The mineral occurrences on the property were worked during the years 1889—1895 by the late Transvaal Silver Mines. The most extensive development was conducted at No. 1 mine (Fig. 1), and a record states that during the years 1892-1895 £160,000 worth of mineral was exported. However, after a short life, the project had to be abandoned, chiefly for the following reasons:—

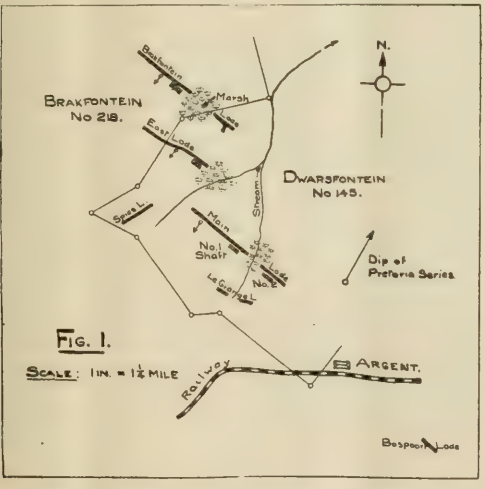


FIG. 1.

SCALE: 1 IN. = 1½ MILE

(1) The low price of metals ruling at that time.

(2) Very expensive transport of materials and plant from the Natal Coast.

(3) Water troubles.

Since then, however, economic conditions have changed to a great extent. The prices of metals have advanced about 150 per cent., the country has been provided with a more efficient train service, mining and metallurgical practice has improved, enabling lower grade material to be treated profitably, and the water trouble has resolved itself into an engineering problem which can be effectively dealt with under present mining conditions. With these improvements in the economic factors, the present promoters can safely rely on a prosperous future for their company.

Lay-out of the Property.

Fig. 1 represents a rough plan of the farm Dwarsfontein, showing the positions of the several outcrops, the shafts, railway, and local surroundings.

The country in the neighbourhod of Argent is gently undulating, and does not present the usual hilly aspect of a mining locality. It is drained by two streams in the neighbourhood of No. 1 mine and the Pretoria Silvers property, but is swampy in the lower lying portions during the rainy season.

No. 1 mine is situated about 2½ miles towards the northwest of Argent Station, and is at present not connected with the railway.

The deposits are being opened up at three points, namely, Brakfontein, No. 1 Shaft and No. 2 Shaft. The permanent buildings are being erected in the vicinity of No. 1 Shaft, as natural conditions appear to be most favourable in this locality. The ground slopes from the shaft to the stream and presents a dumping surface which does not necessitate the elevation of waste materials to any ertent. A pumping station has been erected near the stream for providing water for power purposes, while water for domestic use is obtained from a well near the pump house.

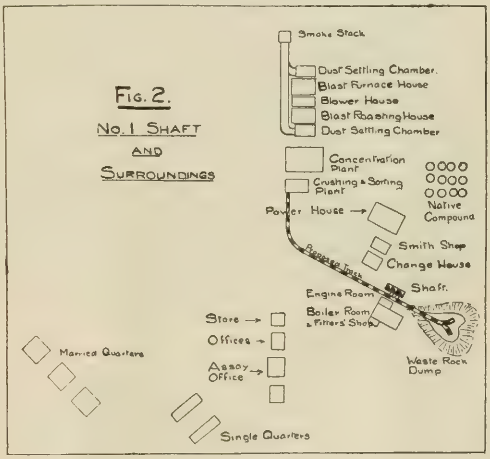


FIG. 2.

NO. 1 SHAFT AND SURROUNDINGS

Fig. 2 represents the surface erections in the vicinity of No. 1 Shaft. The living quarters for Europeans are on the west of the shaft, while the native compound lies on the east.

Fig. 3* represents a view of some of the buildings and offices in their present state. The low-roofed stone building is the only structure which remains at the present day to denote the activity of the company which originally worked the mine. The building on its right represents the assay office, which is in the course of erection.

* For this and other views see Frontispiece.

The surface plant is all of a modern description. The head gears at No. 1 and No. 2 Shafts are of steel construction throughout. In Fig. 4 is seen the headgear at No. 1 Shaft, with the waste rock dump towards the left. The building in the course of erection in the foreground is the change house. The engine room, fitters' shop and boiler house are situated behind the headgear on the right hand side of the photograph. Fig. 5 represents a view of the compressor and power plant building, and a portion of the site for the concentration and smelting plant. The concentrating and other machines used on the property will all be driven by electric motors supplied from two generating sets in the power plant building.

Reduction Plant.

The lay-out of the reduction plant is shown in Fig. 2. The concentrating plant consists briefly of the following: crushers, hand-sorting belt, crushing rolls, jigs for coarse materials, and flotation machines for fines. The roasting plant consists of two Huntington Heberlein pots of 10 tons capacity each with the necessary blowing and tipping arrangements. The smelting plant is made up of the following: two water-jacketed blast furnaces, capable of producing 750 tons bullion per month, dust settling chambers, flues and smoke stack. The draught in the chimney will be produced by a furnace at its base; this furnace will also be used for calcining local magnetite, which will make up a portion of the charge to the blast furnaces.

At present the buildings for the concentration and smelting pants are in the course of erection. The crushing and smelting plant is on the property, while the concentration plant is on order and expected to be in operation by October. The roasting and smelting plant is expected to be in operation about the end of July. The smelting plant is commencing operations with an output of 300 tons per month only. The reduction plant has been designed so as to be capable of extension at any future date.

At No. 2 Shaft a steel headgear has been erected, as well as the engine room and boiler house. Ore brought to the surface is temporarily being dumped near the shaft, but will be conveyed to the smelting works by means of ox-waggon till the permanent means of transport across the intervening space has been established.

At Brakfontein a temporary set of boilers and pumping plant has been installed, and living quarters for men and natives have been erected. Until the railway connection with No. 1 Shaft and Argent has been made, ore from this mine will also be transported by ox-waggon to the smelting works.

Mineral Occurrences.

The mineral occurences on Brakfontein consist of lead silver bearing lodes. Their outcrops are shown on Fig. 1, and have been proved over the following lengths:—

Main lode	7,000 feet
Main cross lode	1,000 ,,
East lode	3,000 ,,
Brakfontein lode	5,000 ,,
Spies lode	3,000 ,,
Le Grange lode	2,000 ,,
Boschpoort lode	800 ,,

With the exception of the Spies lode, they all lie roughly parallel to each other. They occur in the well-known diabase intrusion which is associated with the rocks of the Pretoria series. Here the Pretoria series dips in a north-eastern direction, whereas the lodes dip steeply in a south-western direction. The parallel lodes all strike in the same direction as the diabase and shales of the Pretoria series. As far as is known, however, the lodes are in no way connected with the shales, as they appear in all cases to be far removed from the contact between diabase and shales.

Recent underground exposure of the lodes have only been made in the case of the main lode, and here the lead-bearing and associated minerals have undoubtedly been deposited along planes of movement in the diabase. Evidence in support of this statement is to be seen in many places in the hanging wall, and the general impression the observer gets is that the minerals have filled in the resultant fractures. No evidence of replacement of the country rock by the lode minerals is to be seen, as in all cases the minerals cease immediately after the fractured zone passes into solid rock. Fig. 6 shows the lode as it is exposed in the drive on the second level of No. 1 Shaft. The light patches with white specks represent galema, while the darker patches are country rock. At this spot the fractured zone is not well defined.

The surface of the country in the vicinity of the lodes is more or less flat, with slight undulatoins. The diabase weathers rapidly leaving no traces of its structure at the surface, while the lodes are marked by the presence of a line of more or less compact fragments of the weathered vein minerals, of which secondary silica stained brown by iron oxides is the most prominent. The outcrops can be traced for several thousand feet along the surface in the case of all the lodes.

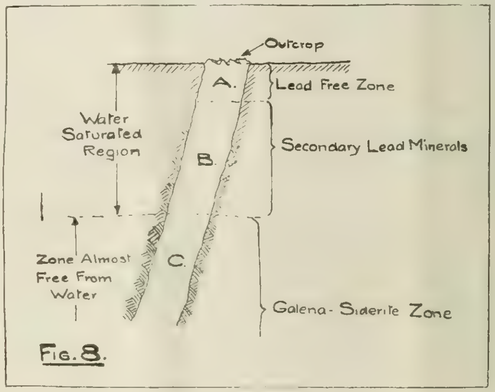


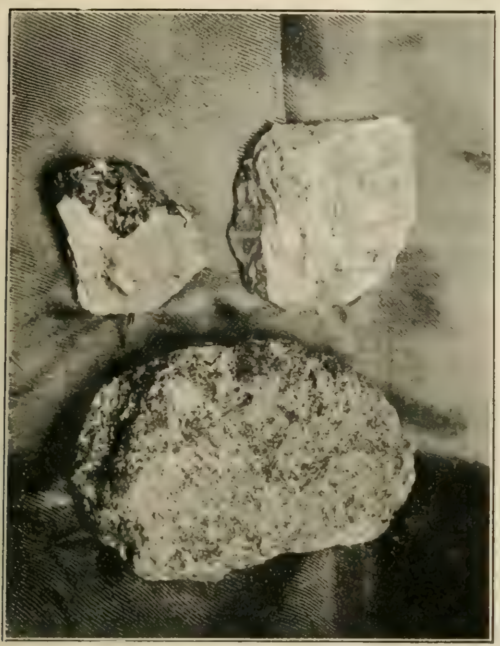
Fig. 8.

Fig. 8 represents the composition and structure of the lodes as one proceeds from the surface downwards. The zone marked A represents that portion practically free from lead. The lead has been removed by the solvent action of surface waters, and the zone consists chiefly of silica and oxides and hydroxides of iron derived from the weathering of siderite. The depth of this zone is not sharply defined, and may vary from a few inches to several feet. Lead minerals have been seen to outcrop practically at the surface in some cases, while in others they have not been found till a greater depth has been reached.

The lead-free zone gradually passes into the zone marked B, where the lead occurs as many secondary and tertiary minerals, all derived from the original galena. It occurs here as minium, the oxide of lead, while small quantities of pyromorphite, a lead chloro-phosphate, crocoite, a lead chromate, vanadinite, a compound of lead and vanadium, are also to be seen. The chief secondary minerals are cerussite, carbonate of lead, which, with anglosite, sulphate of lead, builds up that portion of the lode known as the carbonate zone.

After this the lead occurs in its fresh and unaltered state, namely as galena, sulphide ol lead, associated chiefly with siderite, carbonate of iron, in the zone marked C. Silica in the form of quartz and small quantities of blende, zinc sulphide, and chalcopyrite, copper iron sulphide, are also met with in the zone C.

The carbonate zone is derived from the galena siderite zone by a process of oxidation. The lead sulphide is changed into lead sulphate by oxidation, and the sulphate due to the action of surface waters is converted to carbonate. The siderite present is converted to hydroxides of iron, which are partially removed by the water present. The quartz remains unaltered. Fig 7 is a fragment of oxidised ore from a surface winze. The dark honeycombed structure is the unchanged quartz stained brown by iron oxides and hydroxides, while the white crystals are cerussite, lead carbonate. The porous nature of the ore in this zone makes it an excellent carrier of water, while very little finds its way into the more compact constituents of the zone C. In Fig. 9 is shown a fragment of massive galena (bottom) blende associated with siderite (top left) and chalcopyrite associated with galena and siderite (top right). The chalcopyrite, being bright yellow in colour, is denoted by the dark patches in the photograph.



Minerals Making up Galena Siderite Zone

The depth of the zone B averages about 50 feet from the surface, and it is here where all the water trouble in the mine arises.

The bulk of the silver in the ore is contained by the galena, but cases are on record from other deposits of a similar character where the silver is partly associated with the copper present in the ore.

Like all deposits of a vein-like character, the lode varies in thickness, from several feet down to a mere line of division between hanging and footwall. The proportion of galena to siderite also varies greatly in different parts of the mine. In some portions of the lode galena predominates, while in others again siderite makes up the greater portion of the vein material. These two factors chiefly explain the alternation of rich and poor stretches which one finds throughout the mine. The following figures represent the stope faces sampled to date, with their lead and silver values:—

Stope Width.	Lead %.	Silver ozs. ton.
48	7·8	8·3
39	10·8	10·4
36	16·4	22·1
50	4·9	4·5
33	16·7	16·9
31	14·7	9·5
49	10·6	14·4
48	14·6	15.0
72	32·0	33·7
51	20·8	18·7
42	9·8	7·6
46	3·5	3·2

Two peculiarities are noticeable with regard to stope width and lead and silver content throughout the mine. Firstly, the widest stopes are usually the richest, and secondly, for every one per cent. of lead present there is approximately one ounce of silver to the ton of ore.

The maximum grade of unpayable ore is about 5 per cent. lead, hence the greater portion of the stopes sampled represent material which can be treated at a profit. This fact is also borne out by the following figures, which represent the total ore fully and partially developed at the 31st of March (from last quarterly report of Company):—

Fully developed payable	67,439	11·0	10·5
,, ,, unpayable	2.595	1·8	2·1
Not yet valued	54,500		
Total .. .	124,534		

Of the ore left in tre old workings, not less than 95 per cent. is payable under present conditions.

To the east of No. 1 Shaft, and distant about 500 feet from it, the lode splits up into two portions, the one being a continuation of the old lode, while the other branches off at an angle. After following this course for some distance, the latter branch again turns and lies parallel to the main lode. The values on the branched portion are low at first, but directly the branch becomes parallel to the main lode the values become good again.

Oxidised Ore From Surface Winze.

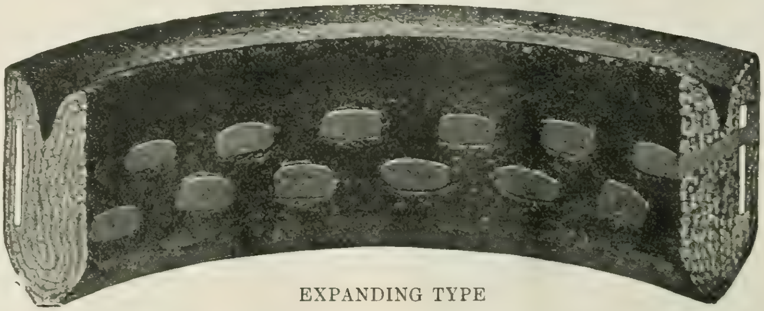
On the east of No. 1 Shaft the lode is crossed by a fault, but what effect this has on the lode is not yet known. Both hanging and footwall in the mine are identical, hence the finding of the lost lode is no easy task. With the scanty evidence to be seen at the fault plane, it is impossible to say whether a fault is normal or reversed, hence the finding of the lost lode becomes a case which can only be decided by trial driving or exploring in both directions along the fault plane. In this particular instance, however, the position of the lode beyond the fault is known from the No. 2 Shaft workings.

At Brakfontein surface indications of the lode are very favourable. The width of outcrop is particularly great, and it is hoped that these conditions will be continued underground.

A deposit of magnetite out-crops to the north of the main lode has been opened up near No. 2 Shaft. This deposit will be mined in order to provide iron ore for use as a flux in the smelting operations.

(To be continued.)

— This —



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New Lease of Life for Messina.

UNION GOVERNMENT TO WAIVE £36,000 PER YEAR RAILWAY INTEREST—A SEVEN AND A HALF PER CENT. PROFITS TAX—MINE TO RESUME PRODUCING.

Good news for the whole Zoutpansberg district as well as for Messina shareholders is contained in the announcement which we are able to make in the following article that the Union Government has arranged to waive the interest on the Messina railway, hitherto payable by the company, and has substituted for it a 7½ per cent. profits tax.

As a result of negotiations that have been taking place at Capetown between the Union Government on the one part and the Chairman and General Manager of the Messina Copper Company on the other, a satisfactory arrangement has now been come to by all parties. The South African Railways, as the owners of the Pietersburg-Messina Railway extension and the farmers and commercial community of the Pietersburg district were also, naturally, directly interested in the matter, and were consulted by the Government during the course of the negotiations. It may be remembered that all parties in the Transvaal Provincial Council recently carried unanimously the following resolution:

On the Road to Messina in Pre-Railway Days. The Great Poort Through the Zoutpansberg.

"That this Council has noted with regret the proposed closing of the Messina Copper Mine as a result of the fall in the price of copper, increased wages, and the responsibility by the company for the railway guarantee of £36,000 to the Union Government. The Council realises the seriousness of the loss which will be sustained by the northern part of the Transvaal due to such closing, and therefore urgently requests the Union Government, by respectful address, to inquire into the circumstances of the mine and to give, at once, such relief in connection with the £36,000 guarantee or in such other way as will enable the company to continue working."

In support of the resolution it was said that the direct result of the closing of the mine would be greatly to increase unemployment. The question was of the utmost importance not only to the mine but to Zoutpansberg as a whole. The farmers were greatly affected, as numbers of them derived their living from the activities of the mine.

Messina Mine Main Shaft. [The Old Working in the Foreground is in the Bonanza Lode.

In the Assembly.

Discussion of the matter was then transferred to Capetown, where the gravity of the position at the mine was laid before the Government by the Chairman of the company, Col. Grenfell, and the General Manager, Mr. A. B. Emery. They were supported in their representations by a deputation of leading residents from the Zoutpansberg district, and it is gratifying to know that as a result of these combined efforts, the Government has decided to recommend the Union Parliament to grant the company a substantial measure of relief. In place of the guarantee of £36,000 payable by the company in monthly instalments, the Government has consented to accept a share of the profits earned by the company over and above the ordinary taxation. That profits tax has been agreed at 7½ per cent., and in view of all the circumstances of the case, it is clearly a much more equitable arrangement than that hitherto subsisting between Government and company.

Profits and the Price of Copper.

Profits are, of course, mainly dependent on the price of copper in the world's markets; and this base metal has, like others, dropped considerably during the past eighteen months. According to the latest mail advices the position of the copper market in the U.S.A. had gone from bad to worse, and conditions were said to be the most stagnant of any period in the history of the business. Prices, however, remained unchanged at low levels. Since then the cables have reported a slight improvement in the position, and it may be that the revival of trade with Central Europe may considerably increase the demand. The latest cash quotation cabled from London this week is £72 12s. 6d.

In this connection it is noteworthy that the great Calumet and Hecla mine in the U.S.A. has started to fill a million-pound copper order recently received from Germany, the first shipment having gone forward. The entire consignment will be made up of 6,600-lb. cakes, which will be used in the construction of locomotive fire-boxes. These cakes and those ordered from Copper Range, of 5,500 lb. and over, are the largest ever called for at the smelters. This is the largest order for export received by Calumet and Hecla since before the War. Its export business since the War has been negligible, averaging not more than 150,000 lb. per month. In former years the company enjoyed a large foreign patronage, depending on the European market, especially that of Germany, for disposal of 60 to 70 per cent. of its production. The order just received may mark the return of Calumet and Hecla to the foreign market; if so, big inroads will be made in its surplus.

Mine to Keep Working.

The Messina agreement with the Union Government includes a provision that the mine must go on producing for a year up to its capacity, and it is further agreed that should no satisfactory turn by that time take place in the price of the metal, the whole position may be reconsidered. The Chairman of the company and the General Manager are to be congratulated on the success of their endeavours on behalf of the shareholders, which also is to the benefit of the whole Northern Transvaal. It is understood that Col. Grenfell has left for London to put the matter before his shareholders, and that in the meanwhile the Union Government will obtain the necessary sanction of the Union Parliament to its variation in the terms of the railway guarantee entered into by it with the Messina Company. We can only hope, for the sake of the base metal industry of the Transvaal that the price of copper will improve during the coming year.

Ventilation at the Springs Mines.

We hope in an early issue to print a description of the ventilation system now in successful operation at the Springs Mines. Meanwhile it is noteworthy that it has won the approval of the Government Inspector of Ventilation and Dust, who, in a report to the Inspector of Mines on the installations made by the manager of the Springs Mines for the improvement of ventilation in that property, wrote as follows:—"There cannot be any doubt of the complete suitability of this ventilation system to the proposed development. This system should be widely used in the long headings on the Far East Rand. It is easily the best method devised so far, and produces cool and pleasant conditions in places that otherwise would be very hot and oppressive. It is inexpensive, simple, effective, and decisive, and is the first successful engineering attack on an important problem in ventilation."

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IMPORTANT.

Our attention has been drawn to Mr. C. G. Elliott's remarks anent THERMIT WELDING, on page 282 of the "S.A. Mining & Engineering Journal," dated November 20, 1920,

"PLATES *vs.* BAR FRAMES."

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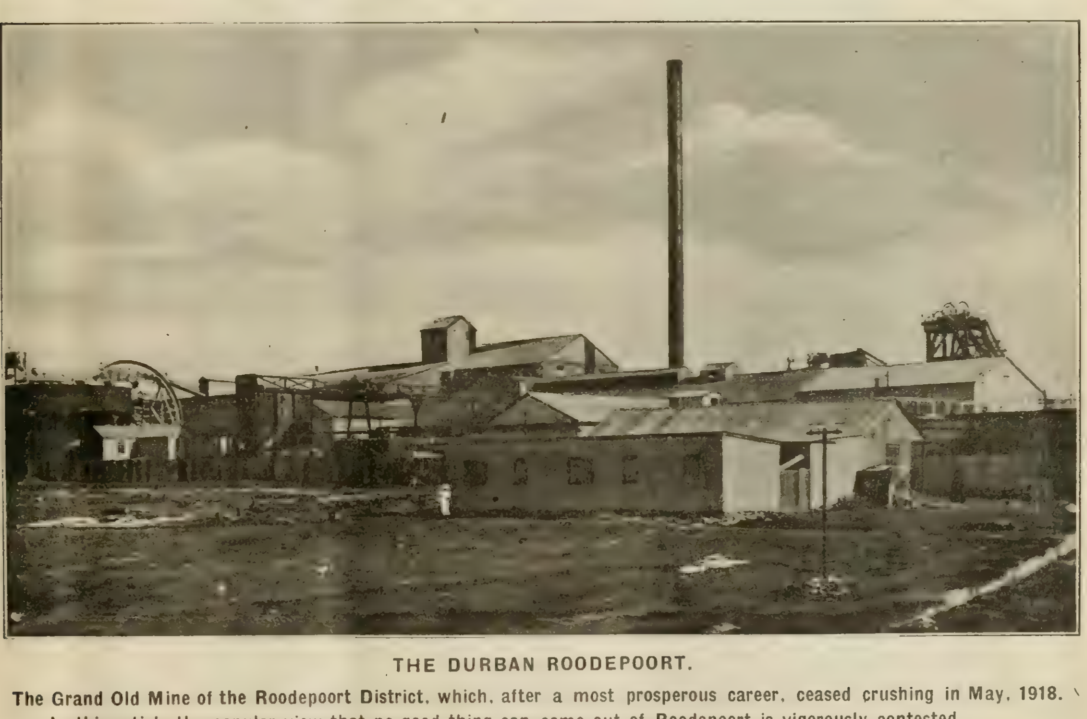
Amalgamation on the Rand.

SUGGESTED FUSION OF ROODEPOORT PROPERTIES—THE PROMISE OF THE DURBAN DEEP—MR. REYERSBACH, "THE GREAT AMALGAMATOR"—SOME RECOLLECTIONS AND RECOMMENDATIONS.

In the following article the recent decided slump in amalgamation activities on the Rand is commented on, and the question is raised whether it would not be well worth while to apply the principles of absorption (which were indulged in so extensively a few years ago) to the Roodepoort area. One is inclined to the belief that such a scheme based on the Durban Roodepoort Deep might well be successful on account of the excellent values recently secured by this company and which were referred to by Mr. F. Raleigh in his speech at the annual meeting of the company a week or two ago.

Mr. Louis Reyersbach, who has been revisiting the Witwatersrand, was referred to in a recent issue of a paper not altogether unassociated with the interests which Mr. Reyersbach served so efficiently a few years ago, as "Mr. Maraisbach."



THE DURBAN ROODEPOORT.

The Grand Old Mine of the Roodepoort District, which, after a most prosperous career, ceased crushing in May, 1918. In this article the popular view that no good thing can come out of Roodepoort is vigorously contested.

This is not the first time that this one-time important personage in the councils of the South African mining industry has been belittled in the esteem of an ungrateful public. One recalls the fact that in the evidence submitted to an important Government Commission which examined the conduct and status of the mining industry a few years ago the President of the Chamber of Mines during the year 1907 was alluded to as "one L. Reyersbach."

Perhaps posterity of the near future will refer to "a fellow called Foch," or if America subdues the world (as some of our pessimistic politicians assert it will) the next generation when properly Yankeeised will speak of "a guy named Lloyd George."

We say this without intent to wound the feelings of the great Marshal of France or to offend the Celtic susceptibilities of the Prime Minister of Great Britain. Neither do we wish to magnify the proper perspective in which Mr. Louis Reyersbach should be viewed.

We merely wish to show how ephemeral is Fame.

For Mr. Louis Reyersbach a few years ago was one of the leading men of the foremost mining corporation of South Africa, and it was in large measure due to his ingenious and active brain that the various big amalgamations of Witwatersrand mines were accomplished.

The Epoch of Fusions.

Into the merits and demerits of those various fusions it would be idle to enquire at this date. The absorptions probably served their purpose well enough for the time and helped to camouflage the essential fact that without reference to the great bulk of shareholders the rich outcrop sections had been gutted. The controlling houses made out a good case for centralised administration and the distribution of management and staff charges over big tonnages. They achieved some wholly satisfactory window dressing and put all the attractions of amalgamation right on the pavement of public vision.

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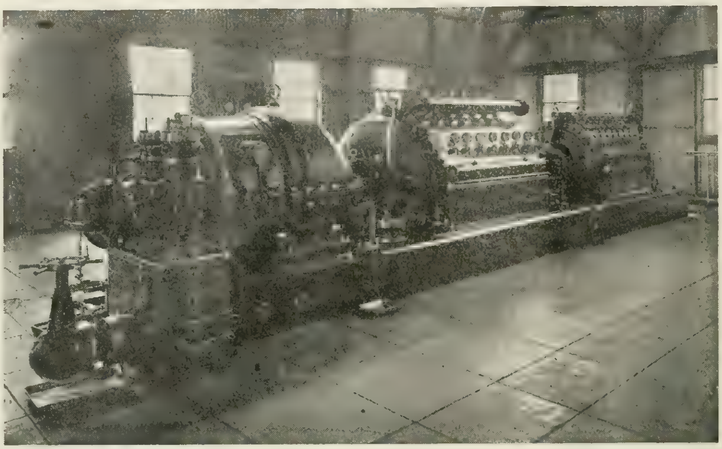
minute—90/95 lbs.



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These fusions resulted, of course, in the prolongation of interest in the Rand by shareholders, whose investments in the richer outcrops had well nigh come to an end.

And one can at least assume that the amalgamations brought some benefit to their sponsors. It is, at any rate, probable that with each new cut and reshuffle of the cards somebody, at any rate, made money.

There are three ways of making money out of mines. Firstly, by means of the flotation; secondly, out of the liquidation; and thirdly, on the reconstruction. The truth of this apothegm will not be questioned by anyone who has had much experience of South African mining ventures, and it therefore becomes a pertinent question to ask just why amalgamation which a few years ago was such a popular phase of Rand mining has gone out of fashion with the emphatic extinction of the Polka in a modern ball room.

The Public's Short-Lived Memory.

It is hardly likely that the aversion to amalgamations is due to the fact that several of the much vaunted fusions of a few years have been utter and scandalous failures.

Those who knead the clay of public opinion know full well that the memory of the man in the street is short lived.

They fully realise that the unsophisticated person with a few quid to invest will forget that the stock of the East Rand Proprietary (now a mine on the verge of closing down and the shares of which are quoted at the magnificent sum of a few shillings) was, just after the amalgamation of its various subsidiaries and when the scrip was quoted at five to six pounds, referred to as the Consols of the Rand just as quickly as a public shorn of gratitude will forget that Mr. Louis "Maraisbach" is none other than "one L. Reyersbach," who was aptly termed the great amalgamator.

Tempora Mutantur.

The Rand works in different ways to-day. The change in policy may be due to the fact that there is now very little left outside of the big rich mines of the Far East Rand to amalgamate.

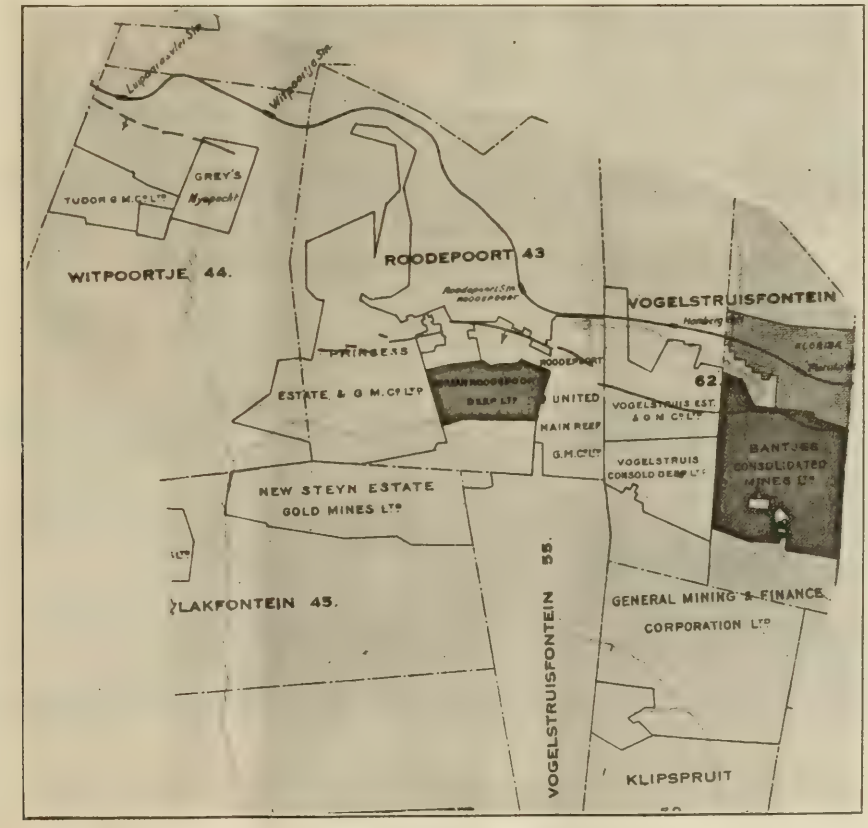
Present-day methods favour absorption of an old outcrop venture by its more prosperous deep level neighbour when that old outcrop has run almost its entire race—as, for instance, was done in the case of the City and Suburban and City Deep.

Or else when exhaustion of ore contents or a calamitous fire or a heavy fall of rock puts an end to the operations of the old stalwart, the concern is placed into liquidation and the machinery and plant are sold to some mysterious syndicate.

A Field for Amalgamation.

There is, however, one section of the Rand which so far has had little of the amalgamation remedy applied to it and it is an area wherein we think the principles of absorption or reconstruction, increase of milling equipment and the economic advantages of crushing on a large scale (which at least exists in theory) could, if honestly and efficiently applied, greatly improve the position and prospect of a portion of the Main Reef series which so far has proved itself to be exceedingly disappointing.

A FIELD FOR AMALGAMATION.



The Roodepoort Mining Area.

We have in our minds the various properties and blocks of disjointed claims lying in the vicinity of Roodepoort. The mines of this section of the goldfields have never achieved much in the way of dividends. With the exception of the Durban Roodepoort, their records have been peculiarly poor.

But we do not consider that these propositions ever have been given a fair and legitimate chance. They have always worked as small units with a very modest basis of crushing and treatment, and with costs which, whilst high in the pre-war epoch, have become utterly excessive during the past year or two.

But, generally, speaking, the values recovered and the grade of ore exploited have not been bad. Moreover, it is a most important fact that in the deepest workings in this area, that is to say, in the Durban Roodepoort Deep Mine, the values and the percentage of payability are abnormally high.

Such encouraging development features in any other area of the gold field would be hailed with satisfaction, but in the despised and unfashionable Roodepoort area they are overlooked.

It is true that the width of reef is not great, and it is also true that the full merits of this proposition can only be realised if it is regarded as a hammer boy mine and not as a machine stoping proposition; but, all the same, we believe that a broad and businesslike amalgamation of interests of these Roodepoort mines, based on the Durban Deep, would bear fruit which would surprise the average student of Rand industrial politics who has got it into his head that no good thing can come out of Roodepoort. The time for such a fusion is not at present propitious. But if, and when working expenses decline and the cost of plant falls, the near West Rand may yet prove a profitable field.

We should like to see some of the enterprise and business acumen of Mr. Reyersbach, the former great amalgamator, infused into such a proposition as we briefly have enunciated in the foregoing. For, whilst we may not regard Mr. Reyersbach as a paragon of all the virtues and abilities which a mining company director can possess, we may at least say of him that he possessed brains.

* * * *

The Central Mining and Diamond Stocks.

It is interesting to note that in the report of the Central Mining and Investment Corporation, a summary of which was contained in our issue of last week, it is stated that "part of the company's holding in diamond shares has been sold at high prices and not yet replaced." This tends to confirm an expression of opinion contained in our issue of February 17th, in the course of which we stated: "They would be very foolish indeed to buy De Beers at top prices, and we do not for a moment believe that they ever did or would do such a thing. More probably at the first sign of a break in the unprecedented period of prosperity which the diamond market enjoyed in 1919 and the first part of 1920 they sold De Beers." The corporation now admit that they sold diamond shares, and in the parlance of the Stock Exchange they had not "covered in" when the annual report was issued a week or two ago. There is, of course, nothing to be denounced in this bit of speculative acumen. It is only business and good business—for them. We merely make reference to the statement because it helps one to view the operations of a big Rand house in proper perspective and because at the time we made our surmise it was represented to us from a certain quarter that our interpretation of the words contained in an important interview was a wrong one. The public can now judge for themselves as to who was right.

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BITUMINOUS SHALES.

IMPORTANT DEVELOPMENTS IN SOUTH AFRICA—ACTIVITIES OF THE ROYAL DUTCH GROUP IN THE TRANSVAAL AND NATAL.

Highly important developments are now taking place in regard to the exploitation of bituminous shale areas both in the Transvaal and Natal. The powerful Royal Dutch group, not content with its extensive options in this Province, are understood recently to have concluded some important business relative to the bituminous oil shale areas of the Impendhle or Underberg district of Natal. We give some particulars of these fields and are glad also to be able to publish hereunder an article on the outlook for the bituminous shale industry of the Union, specially written for this journal by Mr. J. E. Mills Davies, consulting engineer of the African Oil Corporation.

THE IMPENDHLE VALLEY OIL SHALES.

OPENING UP OF PROMISING AREAS IN NATAL —THE ROYAL DUTCH COMPANY INTERESTED.

We learn that important developments are now taking place in the Impendhle district of Natal, where numerous bituminous oil shale areas have recently been taken up. It is reported that the powerful Royal Dutch Shell group, which already has acquired a large interest in the Wakkerstroom area, has acquired options over an extensive acreage in these Underberg shale areas, and we learn on reliable authority that important Natal firms are watching developments in this part of the country with very great interest.

We hear, too that a syndicate in which Mr. Mackie Niven is interested recently has done some profitable business in Underberg shales.

Meanwhile it is interesting to note that fairly extensive work has recently been done in this field by the South African Lubricants and Chemical Works, Ltd. The property of this company is known as the Hlatimbe Valley Oil Shales, referred to in Mr. Cunningham Craig's report on the petroleum prospects in the Union of South Africa of 1914 to the Union Government on page 27, and consists of farm Duart Castle and portions of farms Glenara, Bendyside, Hamland, Duivels Kop, and Oorpoort, together with 39 claims 700 x 700 yards on Crown lands, total area 8,600 acres, of which the oil shale bearing area is about 6,700 acres, situated about 12 miles from the Basutoland border, east of the Drakensberg Mountains.

The property can be reached by broad gauge railway from Durban to Underberg terminus, thence by a good main road for a distance of about 18 miles, then by private road, which is rather out of repair, a further distance of about eight miles leading direct on to the workings.

Geological Formation.

The property under review is mountainous, the structure of the formation is horizontal, and quite undisturbed, consisting of basalt overlying the cave sandstones, red beds, shales, mudstone of brackish water origin, coarse grit (Molteno beds), under which are found lying horizontally in conformity with the formation, seams of oil shales. A full section of the red beds is seen in the deep valley and parts of the Molteno beds. One small dolerite fissure dyke about six feet thick is seen on the eastern part of the property. This dyke apparently runs across from north-east to south-west; no other disturbances or intrusions are to be seen.

The oil shale seams have been proved by adits and cuttings on 10 claims over 7,000 yards.

With regard to the economic aspects of the proposition it is interesting to note that at the general meeting of the company held some little time ago the managing director, in the course of his report, stated:

Approximate Tonnage of Oil Shale per Claim.

The seams being three feet thick, and judging by the specific gravity of the shale, it will take 18 cubic feet of oil shale to the short ton. Area of claims each being 700 yards by 700 yards, after allowing for pillars, shows a tonnage of 700,000 tons per claim.

Disposal of Output.

“ I think I am quite safe in stating that, judging by the enormous continual increase in the consumption of oils all over the world, and considering that we are so conveniently situated as regards shipping, being, so to say, in mid-water, we should have no difficulty in disposing of the whole of our output; in fact, we could sell our output to-day for the next five years ahead at the prices quoted. Therefore, it really means that my estimated capital of one million pounds could be repaid out of the profits in the first 2½ years' work.

Approximate Value of Ground proved.

“ The area proved to date being 7,000 x 700 yards, i.e., 1,010 acres, which shows a net profit of £9,450,000. In addition to this, we have a further 57 claims, 700 x 700 yards. Although no work has been done on them yet, I feel confident that at least 90 per cent. of this ground will be found quite as good, hence the above figures will multiply themselves by 5.”

The Oil Shale Industry.

PROCESSES AT THE PUMPHERSTON WORKS—RETORTING AND REFINING—THE PRODUCTION OF AMMONIUM SULPHATE AND PARAFFIN SHALE.

By J. E. Mills Davies, Consulting Engineer, African Oil Corporation.

In view of the activity now in evidence with regard to the oil shale occurrences of the Eastern Transvaal, where it is hoped that large shale retorting and oil refining plants will be erected, the following description of the processes used at Pumpherston, in Scotland, will doubtless prove of interest.

It will be remembered that a test of the oil shales of The African Oil Corporation, Ltd., was made last year at the Pumpherston works, with very satisfactory results. The subject matter of this article has been mainly obtained from a pamphlet which was issued some time ago by the Pumpherston Oil Company.

The shale on entering the works from the mines—which is frequently by means of rope haulage—is conveyed to breaking machines in which it is broken into pieces of suitable size for distillation; it is then dropped into hopper-shaped hutches, with a capacity of one ton. The retorts may be grouped in one, two, or three blocks, say 30 retorts in length, and two in width, sixty retorts in each block, which has a flat top. The hutches with their ton of broken shale are conveyed to the top of the reotrs by an endless chain on an inclined scaffold. A sliding door in the bottom of the hutch can be operated by a lever on the side; the shale are conveyed to the top of the retorts by an endless communicating directly with it. These receptacles have a storage capacity of 24 hours' supply of shale. The retorts employed are cylindrical in shape, and are built vertically in ovens of four, each with four chambers. The upper portions are of cast iron, 11ft. long, 2ft. in diameter at the top, and 2ft. 4in. at the bottom. The lower portions are of firebrick, about 20ft. long, the diameter at the bottom being 3ft. The necessary heat is obtained from the incondensable gases resulting from the distillation of the shale. In the case of shales of poorer qualities, producer gas is used in addition. Producer gas would not be required for shale of the quality of the Kromhoek seam, which yields about 22,000 cubic feet, compared with 11,000 cubic feet per ton of Pumpherston shale. The heat is applied externally and is caused to circulate round the retort by properly disposed butt-bricks. The heating gas enters near the bottom of the brick portion of the retort, together with a given quantity of air. A temperature ranging from 1,200 to 1,600 deg. Fah. is necessary for this portion of the retort to convert the nitrogen of the shale into ammonia, which is preserved by a continuous supply of steam delivered at a slight pressure into the bottom. The cast iron portion of the retort is maintained at the lower temperature of 900 deg. Fah.; the oil gases are distilled from the shale in this portion. Both these oil gases and the ammonia gas are drawn off by means of exhausters, through a branch pipe at the top of the cast iron retort, and are conveyed to large stacks of atmospheric condensers, placed in the yard near the retorts. The condensed liquid oil, and the water containing the ammonia, flow into a separator tank in which they separate, the lighter rising to the surface by difference of specific gravity. From this "combined" tank they are drawn off to separate tanks. The gases then pass through ammonia scrubbers in which they are "washed" for ammonia, then through naphtha scrubbers, where the lighter gases, which could not be caught in the atmospheric condensers are washed with oil, yielding a good quality of light oil or naptha. The residue forms the incondensable portion used as stated above for heating the retorts. With shale of average quality the incondensable gas is obtained in sufficient quantity for heating the retort blocks, with a surplus in addition available for heating the steam boilers.

The shale in the retorts, supplied from the top, gradually works it way during the distilling process to the bottom, where the spent residuum is withdrawn. The whole of the retort contents are therefore continuously in motion; no fluxing is consequently possible. A cast iron hopper is placed under each two retorts, at the top of each and directly underneath the bottom of the retorts, a cast iron disc, or table, is fixed, with a space left between its edge and the sides of the retort. The whole mass of the shale in the retort rests on this table, the annular space permitting some to fall inte tho hopper. To enable the spent residuum to fall continuously into the hopper, a steel spindle passes through the centre of the table, to the top of which a curved arm is attached extending at right angles to the spindle. As it rotates it pushes portion of the residuum over the edge of the table into the hopper. A slow motion suffices; one revolution in 20 minutes gives satisfactory results.

The spent shale is discharged every four hours into a hutch placed immediately underneath, which permits the shale to fall into the hutch. This hutch when filled is attached to a haulage rope and conveyed to a waste heap This rope, the one for the fresh shale, as well as the shale-breaking machines, are actuated by electric motors.

Ammonia Water.

The ammonia water obtained from the atmospheric condensers is pumped through a heater, in which it is raised in temperature by the spent or waste water flowing from the still, and passes into the top of it. The still is circular in shape, about 30ft. in height and has a series of cast iron shelves or trays fixed horizontally every 2ft. or so from the top to near the bottom. Steam is put into the bottom of the still at a pressure of 40 lb., and passes to the top through a series of conical paps cast on the shelves and covered by hoods, carrying with it the volatile ammonia, whilst the water, after traversing the whole area of each tray, passes down by a seal pipe from one to the other and flows out at the bottom as spent water into a concrete tank containing a cast iron worm, which is the heater mentioned above, for the ammonia water on its way to the still. During its progress from the top to the bottom of the still the water is diverted into a chamber containing milk-of-lime,. which sets free the fixed ammonia not affected by steaming.

The steam and ammonia gas liberated in the still pass over into a large lead-lined tub or saturator, and bubbles through holes in a lead worm round the circumference at the bottom of the vessel. Sulphuric acid is at the same time run into the saturator and sulphate of ammonia is formed at a certain temperature. The sulphate falls into a well, arranged in the centre of the bottom of the vessel, in which are placed two steam ejectors, which blow it out along with some liquor. This mixture is delivered into hutches having perforated bottoms through which the ammonia liquor drains off to a lead-lined table, and passes back to the saturator by a connecting pipe, the solid sulphate being left in the hutch, which is run by an overhead railway to the drying or storage stalls, and from there it is packed up and despatched to the market.

The exhaust steam and waste gases from the saturator are passed into the retorts and utilised for the formation of ammonia from the shale, while the spent water is pumped to the spent shale bing, where it is thoroughly filtered before being allowed to escape from the works.

For dealing with the weak acid water recovered from the refinery, the plant consists of lead-lined tubs into which a quantity of the acid water is run and saturated with ammonia gas until it is near the salting point, when it gravitates into settling vessels in order to separate any tar carried over with the acid water. The clear liquid is drawn into the saturator, where it is quickly converted into sulphate and blown out.

THE REFINING PROCESS.

The marketable output of the industry, required for very numerous and varied purposes, necessitates many processes of refining differing from each other in detail. To describe all would obviously be impossible. The refining processes are all modifications of the following type process. The crude oil is delivered at the refinery into large tanks, which are placed at a sufficient height to feed the stills by gravitation. The oil is allowed to settle for 12 to 18 hours at a temperature sufficiently high to separate out any water which may have passed the test at the retorts. After this water has been run off, the oil is fed into the centre boiler of a battery of oil boilers for the first distillation. The lightest fraction of the oil, ultimately naphtha and burning oil, is distilled off the feeding boiler and condensed in a

MINES DEPT. EXAMS., 1920.
CERTIFICATES AWARDED INSTITUTE.

SURVEYOR'S CERTIFICATES — March, July and October (Extra) Exams 100 %, 50 % and 66 % respectively of S.A. total.

MANAGER'S CERTIFICATES. — Two last Exams. (Sept., Jan.) 17 out of total 28 in S.A

OVERSEER'S CERTIFICATES.—Two thirds of the S.A total for year 1920. 75 % for January, February, March, 1921.

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Mining Institute (Prof. Yates),
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coil of cast iron pipes immersed among water in a tank, cold water being continually run into the tank, whilst heated water is run off, which is cooled in a patent air cooler, and is then used again for the same purpose.

The boilers on each side of the central boiler receive their oil by a pipe connecting with the bottom of the latter; they also distil over the lighter portion of oil with which they have been fed, the heavier portion passing on to a third boiler, where the process of distillation is continued in the same way. The treatment or washing of the remaining oil at each stage, to remove the impurities which cannot be eliminated by distillation, consists in stirring the oil by compressed air for a given time in an iron vessel, with a fixed quantity of sulphuric acid, allowing it to settle and then running off the heavy mixture of tar and acid which separates. The acid-treated oil is then run into another similar vessel, treated with a solution of caustic soda, settled, and the soda tar which separates run off. The acid tars are steamed and washed, the resulting acid water being sent to the sulphate of ammonia house for the manufacture of sulphate of ammonia, whilst the tar is mixed with that from the soda treatments and burned under stills as liquid fuel, being sprayed into the furnace by an air or steam jet. As there is more than sufficient of this tar to distil all the oil at the various stages, the distillation is carried out without cost for fuel, except what is necessary for steam raising.

Paraffin Scale.

The heavy portion of the oil thus treated, which remains from the second and subsequent distillations, is sent from the stills to the paraffin sheds to be cooled, and for the scale, which is ultimately made into paraffin wax, to be extracted. Stored in tanks until cooled to the temperature of the atmosphere, the oil is pumped into the inner chamber of a cooler, which consists of a series of four vessels having inner and outer compartments. At the same time anhydrous ammonia is forced into the outer compartment or jacket; it absorbs heat from the cooler, freezing the oil in the inner jacket into a pasty mixture of liquid oil and solid crystals of wax.

This mixture is then pumped into filter-presses, where a portion of the oil flows away through the cloth, whilst the wax is left behind in solid cakes, but still containing a quantity of oil. These cakes are delivered by conveyors to the back of the hydraulic presses, where they are wrapped in cloth and placed on shelves between iron frames in the presses, most of the remaining oils being by this means squeezed out.

The material obtained from the hydraulic presses is known to the trade as paraffin scale, and as it is discoloured by the small quantity of oil, which cannot be removed by pressing, a process of sweating by steam heat in large brick compartments or stoves is adopted to remove the oil. The sweating plant consists of large iron trays having false bottoms of iron lattice work, into which water is pumped to cover the lattices. About two inches of scale, which has been melted in a boiler, is then pumped into each tray; after it has cooled and solidified, the water is run off, the doors of the stove are shut, and the temperature is gradually raised by passing steam through coils on both sides of the building. As the scale is heated it expands and becomes porous, and a small quantity of yellow oil comes out, finding its way into the space beneath the false bottom, and passing away by connecting pipes.

The scale, through the removal of the oil, as well as some of the lower melting point wax dissolved by it, becomes whiter and of higher melting point, and when the colour and melting point are as desired, the temperature of the stove is quickly raised by blowing open steam into the trays through perforated pipes in the bottom, and running off the wax in the liquid state into the connecting vessels. Here it is steamed with open steam, and after being settled the water is run off. It is then pumped into another vessel, in which it is stirred with a discolouring powder, to remove the last traces of yellow colour, and finally passed through filter paper and run into moulding trays. When cooled the solid white cake is known as paraffin wax, of which there are many grades of qualities and melting points.

From the Scotch shales by the processes summarised the following products are obtained:

Light spirits and naphtha, available for motor engines and cars; varnish making; india-rubber solvent; a turpentine substitute; seed crushing; linoleum making; and many other purposes. The specific gravity is 0.70—0.76, and the spirit contains about 50-60 per cent. of unsaturated hydrocarbons.

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Sulphate of ammonia is mentioned above.

We have not any figures relating to the present cost of retorting and refining at the Scotch works, but it may be stated that before the War retorting, or production of crude oil, averaged say 1s. 9d. per ton of shale, and refining from ¾d. to 1¼d. per gallon of crude oil. The sulphate of ammonia process cost about 1s. 9d. or 2s. per ton of shale, or say £2 5s. per ton of sulphate, allowing for consumption of £1 5s. worth of sulphuric acid.

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EDITORIAL.

GOLD AND WAGES.

Local attention is at the moment more than ever focussed on the subject of wages on the mines of the Rand in relation to the selling price of the product of these mines. The Chamber recently has sought to bring about a general reduction in pay along the Reef and has based the righteousness of its modified demand in this respect upon the substantial and persistent decline in the price of gold which continued almost without interruption from the middle of January until a few days ago. At the outset of the great coal strike in Europe this journal pointed out that the misfortunes of the Mother Country obviously would favourably affect the collieries of the Union and also in consequence of the depreciation in British credit and of the excess of imports into Great Britain over exports from those industrially stricken isles would have the effect of increasing the price of gold. A number of prominent business men disagreed with our prophecies, but they have since been amply verified and it is quite amusing to observe that some of our local contemporaries are now instructing their readers on the lines of the elementary economical principles which we enunciated several weeks ago.

It is also to be noted that the Chamber of Mines finds itself in an awkward quandary in regard to this supremely important question of gold values in relation to effort. Just when the workers were being asked to consent to a general "cut" in wages on the grounds that gold had fallen, the price began to rise, and the miners' delegates to the conference on this subject announced their decision to recommend to their executive the non-acceptance of the proposition put forward by the heads of the industry.

The miners' unions have in more exact language given their opinion that such decrease is not justified. It is understood that a sub-committee from the meeting of men's representatives held at the week-end, will meet shortly, and it is expected that it will prepare a memorandum of the men's case, and this will be submitted to the Chamber of Mines, when it is thought a further conference between the parties will take place.

Whilst there can be no blinking the fact that whether the price of gold remains at about five guineas or whether it increases to one hundred and ten shillings, or even more, the position of a number of mines on the Rand is, and will be, desperate, we cannot commend the manner in which the Chamber has sought to bring about this decrease in wages. We have never ceased to preach the gospel of efficiency and economy on and in the mines. We believe that wages generally are much too high for the indifferent services rendered, and we have repeatedly urged that the Rand should dispense with a large number of its surplus inefficients. But the Chamber of Mines has tackled the business in a manner which is scarcely admirable. Earlier in the year, when the men asked for additional pay, the Chamber refused it on the grounds that the tendency was for the cost of living to fall. The Federation asked that wages should be based on the selling price of gold, and the Chamber retorted that it could not accede to this request.

The selling price of gold is a fluctuating factor, and as we have repeatedly urged it is essential that this great industry should have something less ephemeral than the incidence of the American exchange to live on. But at the same time the price of gold is a more tangible thing than the cost of living factor.

The facts are that at the beginning of the year the Chamber of Mines refused to base wages on the price of gold and appeared to be desirous of making the chimerical and bewildering calculations regarding the cost of living, which are issued by the Union's statistical department, the basis of its policy in regard to remuneration of employees. And yet the other day the President of the Chamber of Mines, in urging upon the workers the necessity for reducing costs, prefaced his argument by referring to the fall in the premium and stated the Chamber's case for a general cut mainly from the angle of gold prices!

And now, unfortunately for the Chamber's argument, the price of gold has, it seems, temporarily turned! After advancing to £5 9s. the price weakened, and at the moment of writing the latest quotation available is £5 8s. The incidence of the American harvest acting upon an already sadly depreciated British credit in terms of Yankee dollars will probably cause gold to rise in price still more ere long and will make the inconsistency of the Chamber's arguments appear all the more palpable.

It may perhaps be contended that the leaders elect of the industry foreseeing the probabilities of an early advance in gold prices and anticipating a demand for higher wages sought, whilst gold was under five guineas, to gain something, afterwards to bargain with when the price rose. If this be the case, then the Chamber recently has acquired a subtlety and foresight upon which it is to be congratulated. The presence of Mr. Samuel Evans in the inner councils of the Chamber as one of its Vice-Presidents has inclined one to the hope that sane and statesmanlike action will be taken in this difficult problem of wages in relation to gold values. He alone of the Wotenagemot of the Rand has exhibited any depth of insight into the intricacies of the question. He alone has, for instance, been able to appreciate our articles of weeks ago on this subject and which predicted even before Mr. Evans mentioned the matter at the recent Crown Mines meeting that quite possibly, owing to an unprecedented advance in the value of gold, three dwt. ore will pay to work on the Rand of the future.

To the majority of the leaders of the mining industry the learned and valuable dissertations of Mr. Evans on the mighty subject of gold in relation to human effort and the prices of commodities are like the technical papers referred to by Mr. Buckle at the last annual meeting of the Chamber, lectures " which we admire so much and of which we understand so little."

At any rate, the Chamber of Mines does not seem to have made too good a job of its efforts to enunciate a logical and sane policy in regard to wages; and the sooner its members make up their minds whether they are going to base rates of pay on premium or cost of living the better it will be for the peace of the industry. The Chamber cannot expect to have a "heads I win and tails you lose" advantage all the time. We have no sympathy with the professional demagogues of modern and arrogant labour, and we reiterate our conviction that European labour on the Reef as a whole is overpaid. But that does not deter us from pointing out the inconsistencies of the Chamber's arguments.

Over a long period of years gold prices must show a proportionate ratio to the cost of commodities. But the cycles of fluctuation need not necessarily be contemporaneous. Sir Evelyn Wallers in his valedictory speech at the Chamber of Mines meeting last year pointed out that the great danger was that the price of gold would fall more rapidly than the price of commodities. Broadly speaking, this statement has been confirmed by the experience of the last few months. But the Chamber must be prepared for material fluctuations in the price of the Rand's product without any corresponding and contemporaneous rise and fall in that very nebulous figure which we term the cost of living. And therefore it is eminently necessary that the headquarters staff of the mines should make up its mind whether it is going to base its wages policy on the price of the product of the mines or on the academic statistics issued by Mr. Cousins.

We do not for a moment wish it to be thought from the foregoing that we are not in sympathy with the campaign which the Chamber has initiated in the interests of economy and efficiency. Our own view is that this effort should have been commenced long ago. More work for less pay is certainly better than no work and no pay, and there can be no denial of the fact that unless the position of many of our mines speedily becomes very much better than at present the grim spectre of unemployment will hover over the heads of thousands of people in Johannesburg and along the Reef.

The point we have endeavoured to make is that the arguments used by the industry's representatives have hardly been consistent. But whatever mistakes have been made in the past, now that the Chamber of Mines has at last decided to demand cheaper service of its workers we hope that it will stand fast on the ground which it has taken up. We trust that the Chamber will pursue a staunch and unwavering attitude founded on a line of argument upon which its executive is wholly agreed and that it will abandon a policy of saying one thing in January and meaning something else in June.

Notes & News.

Mr. W. E. Bleloch's Reply to Dr. Rogers.

We have been asked by Mr. Bleloch to print the following corrected and revised passage in his letter replying to Dr. Rogers, which appeared in our last issue: " A lava flow proved to be a contemporaneous lava flow at Heidelberg may not be the same identical lava flow as one, say, at Government Areas, Modderfontein. Dr. Rogers must admit that one diabase of that period is very like another, and to prove that diabases amygdaloidal or otherwise, occurring so far apart as M[illegible]derfontein and Heidelberg, even if both are flows, are [illegible]nd the same flow, I submit can only be done by m[illegible]he distinctive sedimentary beds occurring above or below them in each place. If there be a marked dissimilarity between the sedimentary above or below the one and those above or below the other, such dissimilarity is real evidence that the diabases belong to distinct and separate flows. That, I submit, is the sound and correct argument. Moreover, the behaviour of the diabases as revealed in the Government Areas (Modder) shaft sections and in the sections from surrounding mines of that area provides the strongest evidence that the diabases there are not contemporaneous flows, but intrusive sills which vary in number and position from shaft to shaft. I submit that the fundamental error of both Dr. Mellor and Dr. Rogers, learned as these gentlemen are, lies in identifying the reefs by the diabases instead of the diabases by the reefs."

* * * *

Harrisdale Diamonds Case.

The Harrisdale case, in which Messrs. Bleloch, Rainier and Richardson were prosecuted under the Company Law, came to an end this week. At the end of the final hearing on the 7th June, 1921, Mr. Juta, the presiding Magistrate, stopping Mr. Morris's address for the defence, said: " If you are addressing me I may say you need not go on. I have never been able to see from the evidence that any of the accused has committed any offence whatever. Of course, if you wish me to take down what you are saying for the information of the Attorney-General I will do so, but for me it is not necessary for you to continue." Mr. Juta then discharged the defendants and said there was no evidence to establish a prima facie case. Consequently no witnesses for the defence were called. This result was due to the complete breakdown of the Government case.

* * * *

Privileged Information.

At a meeting of the Geological Society held two weeks ago Dr. Rogers, head of the Geological Department of the Union, read a very important paper on the Geology of the Heidelberg district. The next morning there was a very brief extract of this in the daily papers. A few days ago the June number of the " Journal of Industries " made its appearance, but in it there is no reference to this important matter. This paper wishes emphatically to protest against this method of publication of the results of Government officials' investigations. Dr. Rogers is a highly-paid official and head of his department. He has been engaged to a very large extent for the past three years in investigating the geology of the Heidelberg district, and this report of his has therefore cost the country some thousands of pounds. We think that waiting and publishing these memoirs in a blue book a year hence would have been bad policy, but when so much has been spent on this why could not his department have arranged for its publication in extenso in the prominent papers of the Union. To give it a concrete case. A Heidelberg prospector, wearied after his search for the elusive Main Reef, might have been in Durban recuperating. He has either to abandon his well-earned holiday and come to this town to hear the words of wisdom from Dr. Rogers or run the risk of someone at the meeting noting the index to the enigma and rushing out and securing the ground first. After all, it is an axiom with the prospector that he only requires to find one good mine in a lifetime, and he can't afford to let that chance slip through a Government official giving exclusive information to a select few. We are sure the daily papers would have found room for an article of this importance, and if they could not surely the expense of publication would have been a very small item on top of the amount spent on its compilation. As with pegging it is essential that the Government see that everyone starts off the scratch line. We have not yet heard of any great rush to peg or secure ground out Heidelberg way on the strength of the information disclosed in Dr. Roger's report. All we contend is that the principle is bad and that the press or the " Government Gazette," or even the " Journal of Industries," is the proper place for these communications, or if read before a society then arrangements should be made for it to be published concurrently in channels available to the public all over the Union.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

FORTHCOMING MEETINGS.

Transvaal Consolidated Land and Exploration Co.—26th ordinary general; Corner House; June 15.

Mining.

Breakage and Heat, Treatment of Rock Drill Steel.—Mining and Metallurgy, May, p. 38.

Open-Cut Mining.—Mining Magazine for May, p. 267.

A New Concrete Shaft.—Mining and Scientific Press, April 30, p. 23.

Coal and By-products.

World's Coal Production in 1920.—*Colliery Guardian*, May 13, p. 1387.

Carbonization.—Journal Society of Chemical Industry, March 15, p. 51.

Spontaneous Combustion.—Iron and Coal Trades Review, March 25, p. 425.

Revolving Tipples.—Can. Mining Journal, March, p. 254.

Engineering.

Electric Winders.—English Electric Journal, April, p. 228.

Electric Locomotives for Industrial Purposes.—English Electrical Journal, April, p. 256.

Electricity Tariffs.—The Engineer, May 6, p. 479.

Surface Electrical Equipment at Mines.—Colliery Guardian, May 13, p. 1387.

Iron and Steel.

The Casting of Metals.—The Engineer, May 6, p. 492.

Metallurgy of Iron and Steel.—Journal of Society of Chemical Industry, vol. 5, p. 229.

Economics.

Subsidence and the Law of Support.—Colliery Guardian, May 13, p. 1384.

Lord Weir's Scheme.—Colliery Guardian, May 13, p. 1388.

The Rise in Engineering Costs.—Colliery Guardian, May 13, p. 1397.

Position of the Engineering and Allied Industries.—Electrical Review, May 13, p. 609.

Export Credits.—Iron and Coal Trades Review, May 13, p. 674.

Industrial.

Retort for Assaying Oil Shales for Oil.—Mining and Metallurgy, May, p. 46.

West Springs.

The following cable has been despatched to this company's London office for publication: "It has been decided to temporarily suspend sinking at the No. 2 shaft in order to sink a borehole from the bottom of that shaft to locate the reef series. In the meantime intensive development from No. 1 shaft will be carried on in the north-eastern section of the area with a view to creating an ore reserve at the earliest possible date."

[Owing to pressure on space a valuable letter by Mr. J. J. Wessels and other features are held over for our next issue.]

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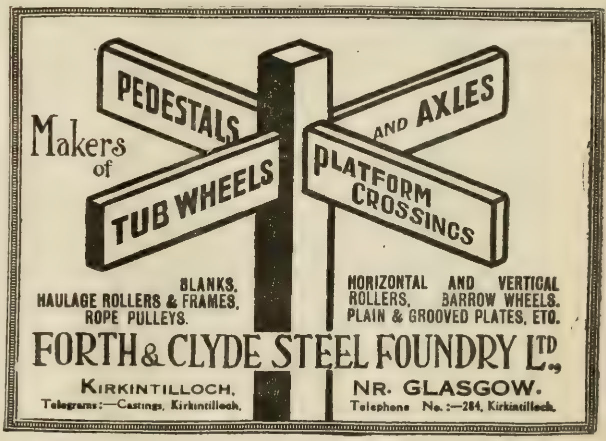

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Big Plans for a Pretoria Steel, Coal and By-Product Industry.

EXPERT'S ENTHUSIASTIC FORECAST—MR. HARBORD CHANGES HIS OPINIONS—RESERVES TO SUPPLY ONE HUNDRED TONS' CAPACITY WORKS FOR 100 YEARS!—IMPORTANT COAL DISCOVERY.

The following extracts from a condensed report by Prof. Ernest Bury, O.B.E., M.Sc., F.C.S., on the case for a South African iron and steel industry, with special reference to the proposals of the South African Iron and Steel Corporation, Ltd., go to show that the present period of inactivity at the Pretoria Works is scarcely likely to last for ever.

It has been suggested that before leaving for England (writes Prof. Bury) I should communicate to the technical Press the impressions I have formed during my visit of South Africa's resources for the foundation of a national iron and steel industry. My visit to the Union was undertaken to examine personally the premises upon which the South African Iron and Steel Corporation's proposals were founded, which during the last year I had studied in England. I have now great pleasure in submitting the following notes in confirmation of the work of South African statesmen, scientists, and men of high technical standing, who have recognised the economic principle that a country's industrial development is dependent on the utilisation of its iron-ore reserves.

Sir R. Kotzé's Views.

The case for a South African iron and steel industry was first published in 1909, in a Government Blue Book, by Sir Robert Kotzé, who pointed to the enormous extent of the country's iron ores and their possible development. This report also insisted that scrap iron and steel should be remelted and used in finished state within the Union, *vice* its *reimportation* to Europe. Mr. F. W. Harbord was engaged by the Government to investigate these recommendations, but reported the establishment of an iron and steel industry in South Africa to be premature, and that the country should confine its operations to the utilisation of iron and steel scrap. These recommendations were adopted, and the Union's iron and steel processes at the present juncture are restricted to melting scrap from iron and steel manufactures imported from overseas. The firms conducting such work have fulfilled their function in eliminating one anomaly, *i.e.*, re-exportation of scrap, but the greater and more vital anomaly remains, *i.e.*, the importation of finished iron and steel from overseas *vis-à-vis* the now proved colossal mineral reserves of the Union.

Enormous Mineral Reserves.

It is due to my countryman, Mr. Harbord, to state that at the time of his investigations the proof of these reserves was not so complete as at the present day. The pure haematite deposits, since investigated by Dr. P. Wagner, and the extent and quality of the quartzite and clayband deposits in the Pretoria town lands, also proved by Dr. Wagner, were unknown to Mr. Harbord. Mr. Harbord's further anxiety was an ample supply of good coking coal within paying distance of the iron-ore reserves. This anxiety has now been removed by the extensive reserves of coking coal in the Middelburg district, amply proved by Mr. Nellmapius. Previous shortage of limestone as blast-furnace flux is met by huge deposits of dolomite adjacent to the iron-ore deposits, in addition to the more recent discoveries of limestone proper. Dolomite is now recognised as an excellent blast furnace flux, and is used almost exclusively in Indian blast furnaces, also in certain connections in the southern States of America. Finally, the question of the foundation of a South African iron industry has now been revived at a juncture when high costs of production as a result of the war have become universal, and, although a substantial reduction is inevitable, it is the general opinion that pre-war standards will never be regained. It follows, therefore, that a country like South Africa, possessing rich, easily won minerals, with previous world technique and development as a foundation, is in a much more favourable position to inaugurate its iron and steel industry than under pre-war conditions.

Mr. Harbord's Views.

It is also fair to Mr. Harbord to state that, with the changed prospects of the sub-continent as an iron and steel producing centre, his views are now favourable to the establishment of the industry in South Africa. Before leaving England I had the opportunity of discussing the subjevt very fully with Mr. Harbord and Dr. J. C. Stead, F.R.S., on the basis of the reports submitted by South African investigators. The net result of this conference was that the margin between cost of production in South Africa and world selling values, allowing for substantial reduction, was ample to warrant the inauguration of the South African iron and steel industry.

The history of the proposition has, therefore, with further prospecting of the Union's resources, passed from the stage of negative criticism to definite assurance.

The Geological Proof.

As this article is confined to impressions, I do not propose to go into a mass of technical detail. The geological proof of the mineral reserves is to be found in the reports of the South African scientists and engineers, Dr. P. A. Wagner and Mr. A. Nellmapius, who have conducted these researches, which cannot be challenged. I should be indulging in the Britisher's failing if I attempted criticism of their work after only a month's examination of the local conditions; on the other hand, I desire to testify to the extreme care and scientific ability with which they have made their geological and chemical deductions. No room is left for criticism, and I confirm their reports entirely. I also support the economic reports of Professor G. H. Stanley, who has bestowed infinite care on this subject. If I have any criticism to make on his reports, it would be to charge his careful estimates of cost of production. He is well on the safe side.

What the Pretoria Works Proved.

I must especially refer to the practical demonstration of pig-iron smelting from South African minerals performed by Mr. C. F. Delfos in Pretoria. This little plant was erected to prove that the refractory character of South African ores was no drawback to their practical utilisation, and further that certain coals in the Witbank area would make a suitable blast furnace coke. Both ends have been served, but much more has been proved. First, an excellent foundry iron has been produced, thousands of tons having found ready sale during the experimental run. Heavy castings have been made from Pretoria iron, including a mine winding-engine drum of 40 tons weight, a sufficient test of its strength and reliability, and motive parts of machinery of all kinds. Excellent steel-making iron, low in sulphur, has likewise been produced by varying the working conditions of the furnace. In fact, given the interposition of a metal mixer before the steel furnaces, the little furnace has shown that excellent foundry iron and steel works iron can be made at will from South African ores, excepting only the titaniferous magnetite.

A Striking Fact

Perhaps the most striking demonstration of all is that this tiny furnace, with a make of 10 tons per day and consequently heavy on costs has succeeded in producing iron at the present cost of bulk production furnaces in England.

The careful and persistent work of Mr. Delfos in producing saleable iron of all grades from South African minerals at this experimental works is of historical importance, and entitles Mr. Delfos and his colleagues to the pioneer position of the South African iron and steel industry.

Coke.

The coke product from certain Witbank coals in the small retort oven erected at this works was excellent, and suitable in every way for blast furnace use; in physical character it is equal to the best Lancashire qualities. The samples I have examined were high in phosphorus, but of no detriment in the basic open-hearth process, which will have to be adopted as the standard method for steel manufacture in South Africa. The phosphorus content of the South African coking coals requires to be carefully investigated, as with the selection of low phosphorous coals, the low phosphorous haematite ores of the Buffelshoek region will lend themselves to the acid steel-making process, and thus render the Union self-contained in special steels in addition to general specifications.

The Corporation's Reserves.

As adviser to the South African Iron and Steel Corporation, I have had to investigate the quality and extent of the reserves acquired by them as the foundation of their business. The Corporation has taken the wise line, before commencing operations, in acquiring ample reserves of all minerals of the right quality, *i.e.*, to constitute a self-contained entity, independent of open market oppression. I am able to confirm, as a result of my visit, that the mineral reserves acquired by the Corporation are adequate to ensure the requirements of an iron and steel works of large capacity (150,000 tons per annum) for at least one hundred years. I consider the previous estimates conservative. The coal reserves acquired by the Corporation will constitute a valuable trading entity in support of the young iron and steel industry, to which it will contribute its profits from the sale of the surplus coal above the requirements of the iron works. It is proposed to treat and utilise the small coal, frequently dumped at other collieries, for the manufacture of iron and steel, by which policy the colliery will have a greater advantage in marketing its surplus. In other words, it is proposed to work the iron industry reciprocally with its colliery, the latter thus constituting a sheet-anchor industry. In addition, therefore, to a wise provision of raw materials, the Corporation has acquired another industry which will at all times be a substantial support to the iron industry.

Future Policy.

The Corporation has further decided not to base its policy upon the present low costs of its raw materials. Its plant will provide for the conservation of fuel, the recovery of by-products, mechanical handling appliances, and generally modern plant as adopted by the principal ironmaking centres of the world. In short the Corporation does not intend to profligate its mineral resources because at present these are cheaply acquired, and full regard is being paid not only to South Africa's advent as a world competitor in the iron and steel industry, but to future competitive stress, and to the conservation of its reserves. In these connections the Corporation proposes to recover the whole of the by-products from coke manufacture incidental to the manufacture of pig iron, and to utilise the waste gases from such plant for the conversion of the pig iron into finished steel as now conducted at the most modern plants in Great Britain, Europe, and America. The by-products themselves may be roughly classified into fuel oils, motor spirit, and fertilisers. Up to the present South Africa has not discovered her oil reserves, and, as in the case of iron and steel, her internal combustion fuels have to be imported from England and America. Artificially-made fuel oils have now permanently entered the markets of the natural products which they can invariably undersell at oil trust prices. The world has now arrived at an Oil Age, and every world power is fighting to secure its own reserves both as a peace and war factor of prime moment. It follows, therefore, that the value of the artificial product is assured. The value of self-produced fertilisers to an agricultural country must likewise be self-apparent; their demand is also assured.

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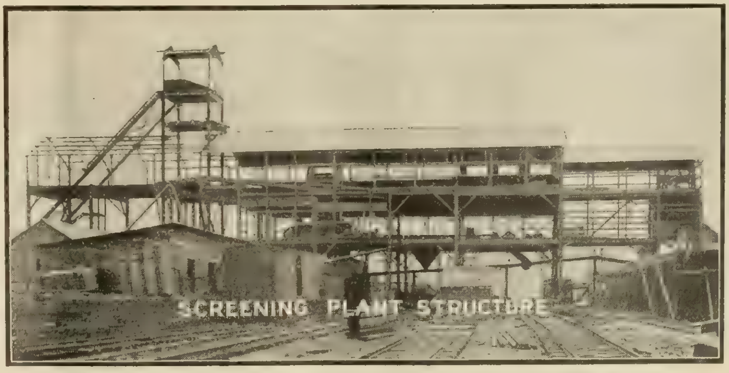

P.O. Box 1034 or

47/48, Standard Bank Chambers, JOHANNESBURG.

May Gold Output : Group Returns.

CENTRAL MINING/RAND MINES GROUP.

Company.	Tons crushed.	Yield in Fine Gold Ozs.	Estimated Value.	Estimated Profit.	Estimated Working Costs per Ton.
City Deep	80,000	37,251	£191,664	65,535	29/ 4
Cons. Main Reef	48,000	17,684	90,220	9,390	33/ 8
Crown Mines	188,000	53,149	273,715	36,144	25/ 3
Dur. Rood. Dp.	27,500	9,638	49,636	5,237	32/ 3
E.R.P.M.	130,000	35,858	184,463	11,243	26/ 7
Ferreira Deep	33,100	10,967	56,480	13,511	25/11
Geldenhuis Dp.	48,637	13,240	68,083	*1,660	28/ 8
Knight Central	27,500	7,167	36,473	3,213	24/ 2
Modder B.	58,000	32,938	169,629	95,153	25/ 8
Modder East	24,000	10,353	52,808	14,380	32/ 0
New Modder	88,000	43,689	225,010	111,617	25/ 9
Nourse Mines	42,200	13,999	71,988	5,017	31/ 8
Robinson	38,500	8,035	40,772	2,810	19/ 8
Rose Deep	52,000	13,705	70,582	10,377	23/ 1
Wolhuter	31,400	7,970	41,045	3,599	23/10
Village Deep	46,000	15,141	77,975	6,890	30/10
Tls. & averages	968,837	330,784	1,700,543	392,456	27/ 0

* Loss.

Modder East: 29,790 tons handled at the mine, of which 17,075 from stopes, 1,676 sorted at the mine, total transported to Apex 28,114.

General Note: The valuation of gold has been taken at £5 3s. net per fine ounce. Costs increased on account of May Day holiday.

BARNATO GROUP.

Mine.	Tons Crushed.	Revenue from Gold.
Consolidated Langlaagte	39,600	£65,269
Government Areas	134,000	280,030
Langlaagte Estate	38,500	63,448
New Primrose	20,900	23,307
New Unified	11,000	13,202
Randfontein Central	121,000	183,778
Van Ryn Deep	49,000	136,246
Witwatersrand	35,300	48,442
Totals and averages	449,300	£813,722
April totals	465,100	£826,811

Mine.	Total Working Costs.	Working Costs per Ton Milled Shillings.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte	£51,628	26.075	£13,971
Government Areas	146,887	21.923	133,900
Langlaagte Estate	52,594	27.321	11,255
New Primrose	21,679	20.746	1,789
New Unified	11,532	20.968	1,724
Randfontein Central	172,039	28.436	13,102
Van Ryn Deep	68,221	27.845	69,014
Witwatersrand	44,016	24.938	6,145
Totals and averages	£568,596	25.310	£250,900
April totals	£571,260	24.565	£261,506

Note.—The above results are arrived at by calculating the gold at £5 3s. per fine ounce.

Monthly Gross Profits: January, £269,638; February, £187,423; March, £253,627; April, £261,506; May, £250,900.

GENERAL MINING & FINANCE GROUP.

Company.	Tons Crushed.	Total Cost.	Cost per Ton.	Total Revenue.	Profit.
Aurora West	10,850	£14,773	27.23	£15,471	£698
Meyer & Charl.	13,700	18,263	26.66	42,316	24,053
New Goch	16,300	19,705	24.18	20,426	721
Roodepoort Un.	22,400	24,850	22.19	23,354	*1,496
Van Ryn Est.	32,500	40,832	25.13	48,887	8,055
West Rand Cn.	33,100	44,582	26.94	48,725	4,143
	128,850	£163,005	25.30	£199,179	£37,670
				Less loss	1,496
					£36,174

* Loss.

In calculating the revenue, gold has been taken at a value of 103s. 9d. per fine oz., less estimated realisation charges.

CONSOLIDATED MINES SELECTION GROUP.

	Stamps Working.	Tons Milled.	Working Costs per Ton Milled.
Brakpan Mines	110	54,500	28/ 1.16
Springs Mines	80	43,900	29/ 0.12
Totals and averages	190	98,400	28/ 6.05

	Value of Gold declared.	Yield per Ton.	Working Profit based on standard value of Gold.	Working Profit per Ton.
Brakpan Mines	£96,180	35/ 3.54	£19,617	7/ 2.38
Springs Mines	82,718	37/ 8.22	19,042	8/ 8.10
Totals and averages	£178,898	36/ 4.34	£38,659	7/10.29

	Estimated Premium, taking Gold at £5 3s. 9d. per fine oz.	Total Estimated Profit.
Brakpan Mines	£20,434	£40,051
Springs Mines	17,614	36,656
Totals and averages	£38,048	£76,707

UNION CORPORATION GROUP.

Company.	Stamps.	Tons Crushed.	Fine Ozs.	Total Revenue.	Revenue per Ton
Geduld Proprietary	100	46,000	15,786	£82,323	35/ 9
Modder Deep	70	41,300	23,233	120,576	58/ 4
Totals	170	87,300	39,019	£202,899	—

Company.	Costs. Total.	Costs. Per Ton.	Profit. Total.	Profit. Per Ton
Geduld Proprietary	£56,205	24/ 5	£26,118	11/ 4
Modder Deep	47,576	23/ 0	73,000	35/ 4
Totals	£103,781	—	£99.118	—

The above results are arrived at by calculating the gold produced at £5 3s. 9d. per fine oz. Realisation charges in excess of normal are debited direct to revenue.

GLYNN'S LYDENBURG.

The following are the particulars of the output for the month of May, 1921, in respect of the above company: Tons crushed, 3,370, yielding 1,352 fine ozs.; estimated value of month's output, £6,829; estimated profit for month, £973. The month's results are based on a value of £5 1s. 3d. per fine oz. net.

Reduced Costs the Main Issue.

NOT SO MUCH A QUESTION OF WAGES AS OF EFFICIENCY—PARALLEL BETWEEN RAND AND BRITISH COAL MINING CRISIS—CRITICAL ANALYSIS OF POSITION BY LORD WEIR—SOME PLAIN SPEAKING.

The prolonged coal mining crisis in England has brought out the fact that the British coal industry has much in common with the Rand, as far as its economic problems are concerned. Lord Weir has contributed to *The London Times* a striking appeal to those mainly concerned in the British dispute, in which he shows that the essential point is that *costs must be reduced*, not that wages must be reduced. Indeed, if we substitute gold for the word coal in the following extracts from Lord Weir's review of conditions, we have a statement that fits almost equally into our Rand conditions at the moment. *Inter alia*, Lord Weir writes:—

The failure of the negotiations between the miners and the coalowners to reach a settlement impels one, however reluctantly, to set forth certain aspects of the question at issue which appear to have become obscure or neglected in the atmosphere of the conference room.

In endeavouring to indicate a basis for a sane and permanent settlement it is essential to have in view the factors which must ultimately control any settlement, and these I would summarise briefly thus:

During the month of March, 1921, the British coal industry operated under conditions of price and cost which involved a loss at the rate of £66,000,000 per annum, without allowance for depreciation or interest on loans. This loss was being met by the taxpayer.

Even under these conditions, the selling price of British coal was too high to secure the retention of the foreign market.

Accordingly the present position of the British coal industry viewed as a single producing unit is that of an industrial unit operating at such a loss as will speedily mean bankruptcy and complete stoppage of all but the most efficient and economical concerns in the industry.

The Selling Price of the Product.

The selling price of British coal is not, and cannot be, termined either by the British Government and Miners' Federation or the Mining Association, but by the economic performance of the mining industries of the United States, Germany, France, Japan, Belgium, etc.

The influence of our greatly reduced exports of coal in the last few years as recorded not only by reduced importing power, but also through the incidence on freights and return cargo values, has not only decreased the economic performance of our islands, but must seriously reduce the standard of living here and cause unemployment or emigration.

The procedure of the Bankruptcy Court involves a complete statement of the bankrupt's position and a full disclosure of his ability to pay. As a general rule it is useless for a man's friends to attempt to help him in his last stages towards bankruptcy. It is better to allow him to go through the ordeal and then help him to start afresh.

Costs of Production.

Let us assume that the examiner in bankruptcy in investigating the coal situation would, in the first case, desire to know what has produced the position, and would ask for a statement of the cost of production of coal for March, 1921. This would be 39s. 1d. per ton, made up of wages cost, 27s. 9d., and the other generally agreed factors. He would then ask, "Why is the wage item so heavy, since in 1914 it was only 6s. 11d. per ton?" To this the answer would be:—

A. Because wages were raised to meet the cost of living.
B. Because it was agreed that the 1914 standard of living of the miner was too low.

Continuing, the examiner would proceed to check this, "Let us take 6s. 11d.," he would say, "and add 133 per cent. to meet the cost of living, then add, say, 20 per cent. to improve the miners' standard of living; this would mean a figure of 19s. 4d. But there is a difference of 8s. 5d. unaccounted for to make up 27s. 9d. What is this difference due to?" I assume the answer would be on the miners' part:—

Worse facilities in the mines, shortage of supplies—tubs, wagons, etc.

New men in pits.

Working thinner or more difficult seams.

More time spent on development work which is not directly production.

The answer on the part of the owners would be:—

Shorter working hours.

Influences arising out of control, in particular the operation of poor mines and possibly impaired effort on the part of the miners, and generally speaking the reduced productivity as evidenced by the drop from an individual output of 260 tons per man per annum in 1913 to 190 tons per annum in 1920.

On hearing this any sensible examiner would at once say:—

Well, I refuse to go any further or to discuss proposals until you both indicate how this absolutely vital influence of lessened production is to be remedied. I can give neither the miner nor the owner any clearance sheet or hold out any hopes of assistance until you both express your readiness to co-operate honestly and frankly to secure at least as great efficiency in production as in 1913. Is it not clear that in this economic world neither of you can succeed until you have repaired this deficit? If you both did as well as in 1913 to-day's cost of 27s. 9d. × 190-260 would represent a cost figure of 20s. 4d. without any change whatever in miners' wages.

Improved Efficiency Required.

In fact, if this was achieved, the March balance-sheet would have involved practically no claim on the Treasury. But the miner would reply, "This means working harder and going back to eight hours per day, thus giving up a great advantage which we as a class have won." The answer to this is:—

Yes, you have won it, but to-day you are experiencing some of the results of winning it.

You have between you and the owners and the Government succeeded in producing a set of conditions wherein you cannot sell your coal and get your wages. However reluctant you may be to recognise it you cannot disregard the ultimate fact that improved conditions can only come from improved efficiency of production, and until both of you agree to work together to achieve this there can be no improvements in conditions or a better standard of living.

This I appreciate is a fairly crude statement of the position, and although the figures are possibly not absolutely accurate they are approximately correct, and give a sufficient indication of relative values.

Not Wages But Efficiency.

My main object is to show that in all the negotiations and conferences attention has been concentrated and discussion has raged round the wrong thing—wages. Common sense demands that concentration should be directed primarily to every factor governing the reduction in the cost of production rather than to wage rate reduction.

Any settlement made on wages alone without due regard to the primary economic conditions will only defer or lead to a harsher ultimate readjustment.

With this as a preliminary clarifier it seems possible to submit certain suggestions towards the lines on which a permanent effective settlement ought to be made.

A. As the first essential and objective is to secure a reduction in the price of coal, closely examine every factor in wage cost to ascertain where contributory savings can be achieved before proceeding to deal with reductions in wages rates.

B. Explore the avenue of reversion to longer hours until the world's economic industry or the increased relative efficiency of the British coal industry permits of a readoption of the seven-hours shift.

C. Previous to the Government control period a percentage of British pits which, without expert knowledge, I would hazard as 2 per cent., was put out of commission every year as non-economic. Under control, when inefficiency carried no penalty, such pits were kept running and were evening running in March, 1921.

Take the period of control as five years, this gives 10 per cent. of all the pits due now to be promptly closed, so that the figures of these pits, if taken into account to-day in any settlement involving finance, must produce an artificial set of figures.

Let the economic position assert itself and close these pits and any others in which the costs are abnormally high. The influence of these inefficient pits on the figures essential to a true appreciation of the situation is vital and should be eliminated at the earliest moment.

D. The owners have expressed their willingness to forgo profits for a time. This strikes me as absolutely futile policy. In the open world market let them make whatever profit they can, but is it not possible for them to agree for a period to pay no dividends and turn any profits over to development, extension, and improvement in productive facilities? They will do more in this way to help their industry and the miners than by any adventitious policy of sacrifice.

E. Let the parties recognise that no settlement is possible which includes further discussion on pools and levies. They are mere artifices and similar to the artifices associated with control which have produced to-day's lamentable situation.

F. A return to district or area settlement for wage adjustment which both miners and owners understand is surely possible, with safeguards to satisfy the miners' central authority. If in spite of all, wage rates require to be reduced, let the reduction be gradual and in accordance with the fall in the cost of living.

G. If throuh shutting down the poor mines abruptly or through technical decisions hardship is caused to some, and if the Government is prepared to help by making a grant or allowance in aid, then that aid should be given not through the owners to the miners by any complicated and involved system associated with wages and group costs, but should be given over to the Miners' Federation together with the responsibility for its proper distribution. This organisation has the most intimate knowledge of who is hardest hit and is, therefore, best fitted to be the medium for administering any such grant.

There are many signs that, given a permanent settlement on sound lines, and the confidence engendered thereby, the British coal industry can still be rehabilitated and set on the way to prosperity. New fields exist for development, extended operations can be carried out in the good mines—more colliers can be employed, for example, by increased double shifting—and generally the technical side of the coalmining industry can be improved. But all this is only possible by the sincere and honest co-operation of both parties on coalmining as an industrial question, and not as a stalking horse for political aims.

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LARGE STOCKS ON HAND.

The Week in the Sharemarket.

THE GOLD PREMIUM—A TIME OF WAITING—DIAMONDS AND BASE METALS QUIET.

The most notable feature of the week has been the rise in the gold premium, which was £5 8s. in London on Wednesday, and, according to some reports has been as high as £5 9s. 3d during the week. All gold shares were steadier as a consequence, notably, of course, those of the Far East Rand group. The immediate future of the gold industry is, obviously, bound up with the negotiations in regard to a reduction in wages; and it is generally hoped that in the best interests of the men themselves, as well as of the industry as a whole, the Chamber of Mines will, on this occasion, present a bold front. A reduction in working costs is imperative if the industry is to be maintained, and it is also clear that there must be a material increase in efficiency all round. The half-year's dividend declarations to be made next week will doubtless be influenced by the attitude of the men towards the proposed wage reduction; and it is not unlikely that a conservative view will be taken in view of the possibility of labour troubles. In other words dividends may not be up to the standard set by the last two half-years. In the diamond market prices remain at very low levels; the successful issue of £1,000,000 debentures by a De Beers subsidiary in London, which is to be followed by the offer of £250,000 of these debentures in South Africa, having excited some interest locally. The terms offered are certainly more attractive than those offered by the Union Government or the Reserve Bank. Consolidated S.-W. Diamonds remain at temptingly low figures, and other diamond shares are lifeless. Silver shares have been more active with several fluctuations, and there has been a little more interest in tin shares. Mr. Julius Jeppe, at the Leeuwpoort meeting, had an encouraging word to say about the prospects of tin; and, no doubt, one of these days when the Central European market re-opens a profitable price may be obtainable for the product of our now dormant tin producers. All colliery shares display an upward tendency, which was only to be expected in the circumstances, and the Natal Navigation-Glencoe merger has materially advanced the shares of both companies. Oils have been quiet during the week, and among industrials S.A. Alkalis have enjoyed a fillip on the usual reports of a satisfactory trial of the new process.

	Fri. 3rd.	Sat. 4th.	Mon. 6th	Tues. 7th.	Wed. 8th.	Thur. 9th.
Anglo-Am. Corp. . .	18 3	18 3	18 9	18 1½*	18 3*	18 6
Apex Mines	7 6*	7 3*	7 3*	7 6*	7 6*	7 6*
Bantjes Cons. . . .	5 6*	5 6*	5 6*	5 6*	5 3*	5 3*
Brakpan Mines . . .	—	54 0†	54 0†	53 6†	50 0*	54 0†
Bushveld Tins	0 10*		0 9*	0 9*	0 11†	0 6*
Cassel Coals	—	—	—	35 0†	32 6†	–
City Deeps	43 0*	43 9	43 0*		—	
Clydesdale Colls. . .	29 0*	30 0	29 0*		28 6*	28 0*
Con. Diamonds . . .	12 9†	12 6	12 9*	12 6*	13 0*	12 9†
Con. Langlaagtes . .			-	11 0†	10 6	10 6*
Con. Main Reefs. . .	10 9*	10 9*	10 9*	10 9*	10 9*	10 9*
Coronation Colls. . .	42 6*	42 0*	—		42 6*	
Do. Freeholds . . .	—	0 11*	0 11*	0 11*	1 0†	1 0†
Do. Syndicates. .	-	4 0*	4 3*	—	—	—
Crown Diamonds. .	2 9*	2 9*	2 9*	2 8*	2 8*	2 8*
Crown Mines	—	—	—	10 0†	—	
Daggafontein Mines.	3 3*	3 6*	3 7½	3 6*	3 6*	3 6*
E.R. Coals	2 4*	2 4*	2 4*	2 4*	2 4*	2 4*
E.R. Deeps	0 6*	0 6*	0 6*	0 6*	0 6*	0 6*
E.R. Props.	4 9*	4 9	4 9*	4 9*	4 8*	4 9*
E.R. Debentures . .	£68*	£70*	£70*	£70*	£70*	£70½
Eastern Golds . . .	0 6*	6*	0 6*	0 6*	0 6*	0 6*
Frank Smith Dmds.	3 0*	3 1*	3 0	2 11*	2 10	2 10*
Geduld Props. . . .	51 6	51 6	51 3	50 9*	51 3*	52 0
Glencoe Colls. . . .	13 9*	13 9*	—	13 6*	14 0*	13 6*
Glynn's Lydenburgs.	10 0†	—	10 0†			
Govt. Areas	82 6*	82 0*	82 0*	82 0	81 9*	81 9
Jupiters	3 9*	3 9*	3 9*	3 9*	—	
Knight Centrals . . .	4 0*	4 0*	4 3†	3 9*	3 10*	3 11*
Lace Props	7 0*	7 0*	7 0	7 0*	7 3*	7 3
Leeuwpoort Tins . .	10 6*		10 0*	10 6	10 0*	
Lydenburg Farms . .	6 0	6 3	6 3	5 9*	5 9*	5 9*
Meyer and Charltons	80 0*	80 0*	—		80 0*	—
Modder B.'s	27 0	26 9*	27 3	27 0b	27 0	26 9
Modder Deeps . . .	45 0*	45 7½	45 3*	45 0	45 3	45 3
National Banks . . .	—	—	—	225 0*	225 0*	225 0*
New Era Cons. . . .	6 6*	6 6*	6 9*	6 6*	6 6*	6 6*
New Geduld Deeps .	1 4*	1 4*	1 3*	—	1 4	1 4*
New Kleinfonteins .	5 10*	5 9*	5 9*	5 10*	—	5 6*
New Modders	68 0b	67 6*	67 6	66 0*	66 9	67 0
Nigels	4 0*	—	4 0*	4 0*	4 0*	—
Nourse Mines . . .	6 9*	7 6†	—	—	—	6 0*
Pretoria Cements . .	53 9*	53 0*	53 0*	52 6*	52 0*	52 6
Princess Estates . .	1 0*	1 0*	1 0	1 0*	1 0*	1 0*
Rand Collieries . . .	—	—	—	1 0*	-	1 0*
Rand Nucleus	1 0*	1 0*	1 1*	1 1*	1 0*	1 1*
Randftn. Est. . . .	14 0†	—	13 6*	13 6*	13 6*	14 1*
Roberts Victors . .	—	6 0*	–	–	—	—
Rooibergs	4 9*	5 0*	—	–	4 6*	4 9*
Rose Deeps	—	11 0*	11 0*	—	—	11 0*
Simmer Deeps . .	—	—	0 3†	—	0 3†	—
S.A. Lands	4 3*	4 4*	4 4	4 4*	4 3*	4 4*
Springs Mines . . .	35 3*	35 0*	34 9*	35 0*	35 3	–
Sub Nigels	12 3*	12 3	12 0*	12 0*	12 0*	12 0*
Swaziland Tins . .	—	—	—	—	6 0*	—
Van Ryn Deeps . . .	74 0*	75 0a	74 0*	74 6†	74 0*	73 3
Village Deeps . . .	7 3*	7 0*	7 3*	7 3	7 0*	7 0*
Western Rand Est. .	3 3*	3 9*	3 7	3 6*	3 6*	3 8
Witwatersrands . . .	—	12 0*	13 0†	—	13 0†	13 0†
Wit. Deeps	13 0†	6 6*	7 0	—	6 6	—
Wolhuters	3 5	3 5	-	3 5†	3 3	3 4½
Zaaiplaats Tins . .	3 4*	3 4*	3 4*	3 4*	3 5	3 6*
Union 5 per cent. .	£97½*	£97¾*	£97¼*	£97½*	£97½*	£97¾*
Hume Pipes	-	—	-	18 6†	16 0*	18 3†
New States	23 3	23 0	23 3	—	23 0*	22 9*
Rouxvilles	1 6	1 0*	0 9*	0 9*	0 9*	1 0*
South Van Ryns . .	2 11*	3 0*	2 11*	2 11*	2 10*	2 10*
S.A. Townships . .	11 0*	11 0*	10 9*	11 0	10 9*	10 9*
S.A. Alkali	19 0	18 3	17 9	16 3	15 6*	17 0
Transvaal Silvers . .	31 3	30 3	29 9	27 9	26 6a	26 6*
Tweefontein Colls. .	19 6†	17 0*	17 0*	17 0*	17 0*	
West Springs	12 0*	12 3*	12 9†	12 0	11 6	11 6
Modder Easts . . .	10 7*	10 6	10 3	10 3	10 6*	10 6
Natal Nav. Colls. .	—	-	-	35 0*	35 6	35 6*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

RHODESIAN CHROME ORE.

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To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—We notice in your issue of the 28th ultimo. a paragraph under Rhodesian Base Metal Output, in connection with chrome ore. We are greatly interested in this commodity, and the 2,000 tons mentioned as having been produced on a property at Darwindale was handled and sold through us. You will no doubt be interested to learn that the chrome from this property is a very high grade, recent analysis going as high as 56 per cent., and we are selling on a guaranteed 50 per cent. basis. We will be extremely glad if you would post on to us the names of any parties that may be to our interest either as buyers or who have chrome properties and require an outlet for their production. The demand for this high grade ore is rapidly increasing, and one of our American friends writes us that the Rhodesian chrome ore is to-day the fashion.

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Mr. Weston has managed mines of gold, tin, copper, silver-lead, wolfram and bismuth, and was Examining Engineer, Rhodesia, for the J.C.I. Co., Ltd.

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ENGINEERING SECTION.

NEWCASTLE IRON AND STEEL.

ISSUE OF 25,000 NEW SHARES—MESSRS. LEWIS & MARKS AND MR. C. G. SMITH TAKE A HAND IN THE GAME—REMARKABLE ACHIEVEMENTS WITH SMALL CAPITAL—A PROMISING OUTLOOK.

The photograph of the Newcastle Iron and Steel Works, herewith reproduced illustrates the position of construction at the works a few days ago. The work which has been carried out on this property has been most remarkable considering the very moderate capital of the company. The capital is being increased from £125,000 to £150,000 by the issue of 25,000 shares at par, and we understand that the production of pig iron will commence in two or three months' time.

Lewis & Marks Invest £25,000.

Some considerable time ago we stated that important interests were identifying themselves with this undertaking. We were not at that time at liberty to divulge names, but the constitution of the present Board shows that Messrs. Lewis & Marks and that enterprising and successful Durban industrial magnate, Mr. C. G. Smith, have become associated with the Newcastle venture.

Newcastle Iron and Steel, Ltd.: Latest photo, showing Engine House, Chimney, Two Stoves, Dust Extractor, and Blast Furnace. This illustrates the excellent progress attained in construction. The photo was taken a few days ago.

An Obvious Consequence.

It was fairly obvious that one result of the notorious iron and steel contract debate and Government action in the House of Assembly last August would be to bring the Union Steel Corporation with its contract and Mr. Eaton with his large blast furnace together.. It will not, therefore, come as a surprise to people to learn that the Union Steel Corporation has taken up twenty-five thousand shares at par.

Overtures?

Neither is it surprising to learn that the associations, which somehow " got to hear " of the Government contract with the Pretoria people, have had overtures made to them with a view to an even closer association of South African iron and steel producers, prospective as well as actual.

The Company's Position Defined.

A circular just issued by the Newcastle Company with reference to the issue of 25,000 new shares states:

There are several reasons why this increase of capital is necessary, the principal ones being as follows:

Increase of Plant.

It has been thought advisable to increase the capacity of the plant from approximately 120 tons per day to 140 tons per day, and this has necessitated enlarging the furnace and stoves. It has also been decided to erect a third and fourth stove at an early date, and the steel work for the third stove is already on the property. In addition, a second blowing engine has been purchased and is now being installed. This will secure the continuous running of the plant, which, in the event of a mishap, might have been hung up, with only one engine.

Brick Plant.

The company's own requirements having proved greater than the output of bricks, it was decided to add to the plant, which has been done, and the supply of building and fire bricks is now almost doubled. This part of the concern has already saved considerable sums of money in cost of construction and at periods when any class of brick was almost unobtainable from outside sources. A deposit of fire clay is now being worked on a royalty basis and there will be no need for us to import expensive fire bricks.

Ore Deposit.

A very valuable farm within reasonable distance of the works, containing a large deposit of high grade iron ore, running into millions of tons, has been offered to the company, and the board have resolved to purchase outright. On a conservative estimate there is sufficient ore on this farm to keep our present plant running for over forty years.

Colliery.

The company has secured an option on the Fairleigh Colliery, which is situated within two miles of the works, and a new prospecting shaft is now being sunk, with a view to opening up and developing the coal thereon, which is considered to be suitable for making excellent coke, of which your company will use large quantities.

Construction.

The extra cost of skilled labour, additional railway rates, adverse exchange rates on machinery from abroad, etc., has caused the estimates in connection with the construction of the plant to be exceeded.

Progress at Works.

As advised in previous circulars, considerable delay has been caused from lack of the necessary skilled labour required to complete the work of construction. Further delay has lately been caused through want of fire bricks for lining the furnace and stoves, and it is owing to this delay that arrangements have been made to work a nearby deposit of fire clay on a royalty basis. The special fire bricks for the furnace and stoves take some time to dry out, but now that the requirements of fire clay are assured the completion of the plant will be hastened and the production stage advanced considerably.

The whole of the construction work has been carried out in a most excellent and substantial manner and reflects great credit on all concerned.

Shareholders will be pleased to learn that the Union Steel Corporation (of S.A.), Ltd., have interested themselves in this company by taking up £25,000 shares at par. It is quite possible that the Union Steel Corporation (of S.A.), Ltd., will, in course of time, be one of the company's largest customers for pig iron."

Provided that the Newcastle people can procure adequate quantities of coke containing a sufficiently low percentage of sulphur, we see no reason why this Newcastle enterprise should not be one of the most successful undertakings in the Union. It looks indeed as if a dividend of 30 per cent. per annum is not beyond the bounds of reasonable achievement.

HIGH STEAM PRESSURE.

Readers will have noticed in the daily Press that Pretoria has decided to install a new and up-to-date lighting and power plant, costing something in the region of £300,000. In accordance with latest power station practice a steam pressure of 350 lbs. has been adopted, which will ensure very low fuel costs. The power plant will consist of three turbo-alternator units of 3,000 K.W. each, the order for which has been placed with the British General Electric Company, Limited, of Johannesburg. The turbines will be built in their Fraser and Chalmers Engineering Works at Erith, and the electric portion in the G.E.C. Works at Witton. The boiler plant order has been secured by Messrs. Reunert and Lenz for Babcock and Wilcox boilers. It is interesting to note that British factories, despite keen competition, have been successful in securing this order.

Oil v. Coal.

In view of the erection of oil tanks at Durban for marine purposes, it is interesting to learn that the "Aquitania," driven by oil, and the "Mauretania," using coal, have sailed from Southampton with altogether 4,000 passengers within an hour of each other, and their arrival at New York is awaited with interest, it being regarded as a contest between oil and coal. Both vessels carried their original crews as stewards. The strike has collapsed. The "Olympic" has sailed from New York with 3,000 passengers, a record number since 1914.

S.A. Townships Meeting.

Mr. Julius Jeppe's speech at the annual meeting of the S.A. Townships, Mining and Finance Corporation, Ltd., as befitted the extent and variety of interests of that institution, covered a wide field. He had something of interest to say regarding the mining and general industrial outlook, and his views will help to strengthen confidence in the commercial future of the Transvaal at a time when it is certainly needed. A report of Mr. Jeppe's speech will be found elsewhere in this issue, and it will be found a useful antidote to the prevailing pessimism. The S.A. Townships has, of course, large interests in real estate in Pretoria as well as the Rand. It embraces the broad acres that formerly went to make up the property of African Farms, and its future is, therefore, bound up directly with the whole industrial future of the Province. Coal and tin through the agency of the S.A. Coal Estates (Witbank), Ltd., and the Leeuwpoort Tin Company, bulk largely in its portfolio; and will, doubtless, in time substantially augment its profits.

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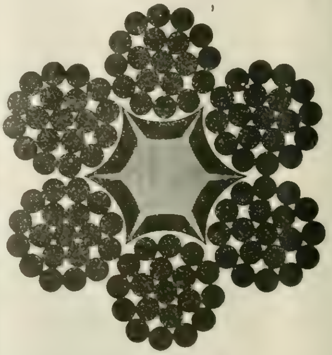

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

GENERAL POSITION—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—MINE WAGE REDUCTIONS—OIL—BRITISH COAL STRIKE AND LOSSES—WORLD TRADE IN 1920—BREVITIES.

General Position.

Business during the week was maintained at about previous levels, both as regards volume and prices, but the latter are still on the downward plane. Merchants in general are looking to a continuance of present conditions for the remainder of the year, but are much perturbed at the policy of the mines in their hand-to-mouth buying, which, however, in view of the unsettled conditions, both as regards costs and the price of gold, can well be understood. The recent slight advance in gold is attributed to the heavy importations of coal into Britain, and with the approaching importations by the Old Country of cereals from America no great fluctuation in the gold premium is expected before the end of the current year. But that the premium, on which many of our mines have been existing of late, must eventually decline to normal is absolutely certain, and in this connection, as in the case of other chairmen at company meetings, Mr. Julius Jeppe at the annual meeting of the South African Townships pertinently referred to the existing high costs of wages and stores and to the absolute necessity, if many of our low-grade propositions were to continue to distribute money to workers (leaving dividends out of the question), of a lower basis of costs. He referred also most hopefully to the coal and iron industries of the Union, which under more normal conditions should contribute to South Africa's industrial welfare. The coal strike in Britain is now assuming more favourable conditions as to a possible solution than we have heard about during the continuance of the dispute, and commercial circles are hopeful that at length a settlement is in sight. The sub-committee of the trade unions' representatives dealing with the proposed reduction in wages met on 7th inst., and decided to make recommendations to the joint executives concerned on June 14.

Iron and Steel.

Business has been exceedingly quiet this week, and the usual beginning of the month purchases by the mines having now ceased the Commercial Exchange is inactive. Latest quotations: Dunswart, 29s.; Union Steel Corporation, Ltd., ordinary sized rounds, flats, and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 55s.; ⅜ in. iron, 40s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 52s. to 62s.; ¼ in. square iron, 60s.; ¾ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. to 62s. 6d.; channels and joists, 47s. to 48s.; imported angles, 45s. to 47s.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ¾ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in., ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ¾ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. to 57s.; shovels, 60s. to 70s.; wheelbarrows, 70s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d. per 98 lb. coils; 24s. to 25s. per 68 lb. coils; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb.

Iron prices, under pressure of foreign competition, are still declining in Britain; East Coast hematite iron has dropped from £12 per ton at the end of January to under £8 at end of May, and Cleveland No. 1 from £11 5s. to under £6.

World's Most Powerful Rolling Mill Engine.

This is in course of erection in a British steel works and is intended to drive a train of 32 in. finishing rolls for large sections of steel. The maximum horse-power developed is 25,000, at a speed of 140 revolutions per minute. There are three cylinders, each 45 in. in diameter, and with a stroke of 52 in. Joists up to 24 in. deep and 12 in. wide will be rolled in this mill. The makers guarantee that the engine will be capable of reversing four times in one minute at least. The engine is carried on a massive concrete foundation with an iron casting 2 ft. deep—weighing over 100 tons—embedded in it. Small auxiliary engines are used to operate the reversing gear and also the stop valves.

Timber and Building Materials.

Business is dull in the absence of building activity. Stocks are abundant. 3 x 9 deals are 1s. 4d. to 1s. 4½d.; scantlings, 1s. 3d. to 1s. 4d.; beaver board, 5d.; oregon, 9s.; pitch pine, 9s. 6d. to 10s. 6d.; floorings, 8½d. to 8¾d.; ceilings, 5¼d. to 6d.; corrugated iron, 24 gauge, 9½d. to 11d. Furniture timber: Japanese oak, 1 in. to 2 in., 1s. 8d. to 1s. 9d. per sq. ft.; Burmah teak, 20s. to 21s.; American oak, 1 in. to 3 in., 1s. 6d. per super; American black walnut, 1 in. to 4 in., 1s. 7d. to 1s. 8d. per super; West African mahogany, 1 in. upwards, 2s. 1d. to 2s. 3d. per super; 3-ply ash, 5 m.m., 10d. per super. Bricks are ruling at 70s. for stock; 60s. for mixed; £4 10s. £5 for wire cuts; and £5 for pressed per 1,000 at yard; white lime, 7s.; unslaked, 10s. 6d.; blue lime, 4s. 6d.; blue plaster lime, 5s. 6d.; cement, 11s. 6d. a bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 47s.; 3-ply, 55s. 3d. The supply of building operatives is at present still plentiful.

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The Master Builders have given notice to the Department of Building Industry of their intention to terminate the agreement entered into in February last. The present agreement, therefore, which under the Ashburnham award gave the workers 4s. 3d. per hour, but rejected the men's demands for payment for wet weather and for all gazetted holidays, will expire towards the end of August. It is expected that a joint conference will shortly be held and an amicable settlement arrived at.

In Britain the National Wages and Conditions Council for the building trade has cut the rate per hour 2d., bringing the scale for mechanics to 2s. 2d., plumbers 2s. 2½d., painters 2s. 1d., and labourers 1s. 11d. These reductions are to operate on a sliding scale with the fall in the cost of living.

The sale of mining material, etc., at the Knights Deep mine (western section) was largely attended and very satisfactory prices were realised.

Second-hand Iron and Timber Yards.

These have no better business to report, but yards are filling up well with material; iron is selling at 6d. to 7d.; timber at 1s.; casements, 9s. to 25s.; doors, new, 35s. and upwards; mouldings from 2½d.

Electrical Goods.

Business is very quiet in town and country and orders are coming in sparsely. Not much improvement is expected until the building trade takes a turn for the better and more current is available, which we are informed will not be before September next; everything is, however, being prepared by the Municipality in anticipation of the arrival of the plant towards the middle or end of August. As foreshadowed, some prices of electrical wares are easier, notably tubing, about 10 per cent., wiring also from 5 per cent. to 10 per cent.; lamps are about the same, viz., 21s. to 24s. wholesale, 24s. to 30s. retail; Osrams, 30s.; some lamps are being sold retail at 2s. apiece. The tendency at present is for prices still further to decline, as some dealers are being forced to sell at a loss. Goods are arriving steadily, and one prominent dealer stated that he had just received a consignment showing a reduction of 15 per cent. more than he expected.

The Municipal Engineers' Congress Visits the Hume Pipe Factory.

On Monday last the members of the Municipal Engineers' Congress now sitting in Johannesburg availed themselves of the invitation of the managing director to visit the Hume Pipe Company's factory at Germiston. The members were driven out to the factory in motor cars. Special demonstrations of the manufacture of large diameter pipes were given and the whole process explained thoroughly in detail; 5 ft. internal diameter pipes, made to carry a test pressure of 150 pounds per square inch, were shown both as to finished pipes and before any concrete was placed in position over the reinforcements. These pipes are probably the largest concrete pipes for pressure purposes ever manufactured. The members of the Congress were greatly surprised at the size of the factory—some 23 acres of land, all covered with factory buildings and pipes in various processes of seasoning, evidently a much larger number than they had expected. Mr. Stainthorpe, the President of the Congress, thanked the managing director and works manager for their courtesy in granting the members of the Congress the object lesson of the inspection, especially in view of the fact that the visit had been made at such short notice.

Rand Mines, Ltd.

The chairman, Sir Harry Ross Skinner, in presiding at the annual meeting, went fully into working costs for the past six years and the enhanced premium on gold, which had enabled the corporation to do so well during last year. As regards working costs, he stated that these had increased from 1915 to last year by 8s. 1.3d. per ton milled, equalling 44.8 per cent.; and that white wages had increased by 77.7 per cent. per ton milled. It was apparent that in the case of many companies with low-grade ore their continued working could only be achieved by decreased expenditure in the shape of lower wages and higher efficiency. Owing to the increased depth at which mining is being carried on to-day, costs have a tendency to increase, and therefore the standard of efficiency should, he stated, be considerably increased in order to enable our low-grade propositions to live. He said that there were enormous ore reserves, which, although to-day could not be worked at a profit, would pay with decreased working costs. With regard to the huge sums paid the Government by the industry, he urged more sympathetic treatment.

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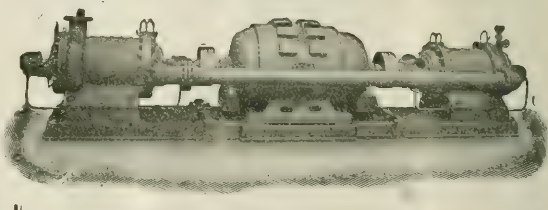

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Oil Reservoirs.

The first tank steamer has arrived at Durban with a supply of fuel oil for the new oil bunkering station at Island View, and is now pumping her load of oil into the huge storage tank, with a capacity of 9,000 tons, recently erected to the order of the Vacuum Oil Co. of South Africa. Other reservoirs of large capacity are being erected for the Anglo-Persian, British, American, Texas, and other concerns.

Petrol has been reduced by 6d. per gallon in Britain. The British Shipping Controller, speaking recently of the future of the oil engine for marine purposes, referred to a British ship of 12,000 tons which had been out to the Far East and back at a speed of 12 knots on a consumption of oil of only about 20 tons per day, whereas a steamship would have required about 80 tons of coal per day.

Oils and Colours.

White lead in oil, small sizes, 1s. per lb.; 42s. 6d. per 50 lb. kegs; red lead, 1s. per lb. in 6¼ lb., 12½ lb. and 25 lb. kegs; 11d. per lb. in 50 lb. kegs; dry white lead, 1s. per lb.; linseed oils, raw or boiled, small bottle 1s. 9d. each, 7 lb. tins 9s. 6d. each, 4 imp. gall. 45s.; spirits of turpentine, small bottles 2s. 6d. each, 12s. 6d. per .83 imp. gall.; turpentine substitute, 6s. 6d. per tin, each 5-6th imp. gall.; red oxide in oil, 50s. and 65s. per 100 lb., 50 lb. 32s. 6d., 25 lb. 16s. 6d., 12½ lb. 9s., 6¼ lb. 5s.; purple oxide in oil, 45s. per 50 lb. keg, 25 lb. 25s., 12½ lb. 12s. 6d.; finest linseed oil putty, 6½d. per lb. in 100 lb. drums bulk; finest English putty in bladders, 8d. per lb.; colours ground in oil, 1s. 6d. to 5s. 6d. per lb.; dry colours, 6d. to 15s. per lb.; colours ground in water, 1s. to 2s. per lb.; in turpentine, 3s. 6d. to 11s. per lb.; in gold size, 3s. 6d. to 6s. 6d.; ready mixed paints, 1s. 6d. to 2s. 6d. lb. (70 lb. drums); leadless flat wall paint, 32s. 6d. per 5-6th imp. gall., 37s. 6d. per imp. gall.; roof paints, 1s. 6d. per lb.; varnishes from 30s. to 47s. per imp. gall.; alum, in powder, 9d. per lb.; creosote, 4s. 6d. per 5-6th imp. gall. tin; gum arabic, 3s. 6d. per lb.; resin, 8d. per lb.; coal tar, 4s. 6d. per .83 imp. gall., 17s. 6d. per 4 imp. gall.; Stockholm tar, 9s. 6d. per .83 imp. gall., 47s. 6d. per 4 imp. gall.; common glue, 1s. 3d. per lb.; good quality cake, 1s. 9d.; finest Russian, 2s.; English gold leaf, plain 3s. 9d. per book, transferred 4s. 3d. per book; aluminium leaf, plain 1s. 9d. per book, transferred 2s. per book; Windsor & Newton's tube colours, 9d. to 5s. 6d.

Coal Strike, Wage Reductions, and Losses.

The Swanwick Collieries in Derbyshire, which employ in normal times 1,000 men, re-opened work last week, the men accepting a flat rate reduction of 2s. 6d. per shift, with the understanding that they will abide by the terms of a general settlement.

The British Engineers' Association has published a statement relating to the coal strike, which shows, inter alia, that the tonnage of coal raised per unit employed in the March quarter of 1921 was only 68 per cent. compared with the corresponding figure for 1913, and that 99,700 more workers were employed. The mines average yearly earnings per unit increased from £82 to £232, being an increase of 183 per cent., whereas the cost of living increased 152 per cent. The average wages in Britain rose from 6s. 4d. to 26s., and the average selling price from 10s. to 33s., while the coal exports fell from 97,000,000 in 1913 to 38,000,000 in 1920. The loss sustained by coal owners in March, 1921, was at the rate of £85,000,000 annually. As the result of the stoppage of work on the mines only 13 out of 303 blast furnaces were operating in April; the amount of pig iron produced was 60,000 tons compared with a monthly output of 855,000 tons in 1913. The iron and steel industry in the Midlands has booked a large number of orders for execution as soon as coal supplies are available.

The Senior British Trade Commissioner in Australia announces that the share of the imports of the United Kingdom, which had fallen to 46.6 per cent. in 1918-19, reached 67 per cent. for the last half of 1920, while the figures for the United States and Japan, which had risen during the War period, underwent a reduction of more than 100 per cent., viz., in the case of the former dropping from 29.3 per cent. to 11 per cent., and the latter from 11 per cent. to 5.4 per cent.

Failure of the Cotton Trade Wage Negotiations.

It is reported that all the Lancashire cotton mills have closed down, throwing out 500,000 operatives to join the ranks of the unemployed, who now number nearly two and a quarter millions, in addition to about 1,000,000 on short time. Such is the gravity of the industrial situation that the Government is reducing the unemployment insurance benefit and increasing the contributions payable by the State. All the money in the fund having been absorbed some weeks ago, the current payments are being made out of the Treasury loan.

World Trade in 1920.

The following statistics of the value of the imports and exports of the United Kingdom as compared with those of the other countries named are given in the latest issue of the British Board of Trade and will prove of interest:

	Imports.	Exports.
United Kingdom	£1,714,336,000	£1,335,569,000
United States	1,099,875,000	1,683,504,000
France	1,416,198,000	897,390,000
Belgium	146,621,000	347,927,000
Japan	237,506,000	195,587,000
Holland	277,677,000	141,788,000
Brazil	124,406,000	107,514,000
Canada	274,812,000	261,602,000
British India	222,606,000	185,358,000
Australia	147,282,000	128,065,000

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BREVITIES.

Capetown Harbour Extension.

The Railway Board has appointed a special committee of experts to consider and report on the question of harbour extension in Table Bay, and it is expected that the committee will commence its investigations forthwith in time to present a report to Parliament before the present session ends.

Grant of Credits.

The British Government has introduced an amending Bill in the House of Commons whereby the 26 millions sterling already authorised for grant of credits to foreign countries will become available for guaranteeing drafts against shipments to all parts of the Empire, including the Protectorates and mandated territories.

Cape Explosives Works Loan.

This issue, it is reported from London, will consist of £1,000,000 first debentures, issued at 95 and bearing interest at 7½ per cent., principal and interest being guaranteed by De Beers. It is understood that the allotments will be on the basis of 20 per cent. of the amount applied for.

Obsolete Warships Scrapped.

One hundred and thirteen warships, including the original Dreadnought, battleships and heavy and light cruisers, have been disposed of at a flat rate of 50s. per ton actual displacement.

Workers in German factories are opposing a compulsory eight-hour day and are demanding longer hours. In Britain unfortunately it is the reverse.

Suez Canal Co.

This company made a profit last year of 267 million francs, and an early reduction of 25 centimes per ton in shipping charges is foreshadowed.

Reserve Bank Officials.

Mr. E. W. Cattel (of the Standard Bank) has been appointed chief cashier of the Union Reserve Bank, and Mr. Alexander Burns (principal clerk of the Treasury) chief accountant and secretary

Tramways Returns for week ended May 28, 1921.

Car miles run were 91,332, as against 86,925 for the same week last year. Total receipts amounted to £11,981, the average receipts per car mile being 31.48d. The corresponding figures for the same week in 1920 were £9,011 and 24.87d. respectively.

Electric Lighting Scheme, Municipality of Middelburg, Cape.

Tenders up to August 2 are invited for the supply of material and erection of the proposed power station for above scheme.

Commonwealth Steamers.

A Melbourne cable states that the profits of the Commonwealth Steamship Line last year decreased by £1,000,000.

French Electricity Scheme on the Rhine.

The French Senate has adopted a vast scheme to obtain power from the Rhine, providing for 18 power stations between Avignon and the Swiss frontier. The Municipality of Paris will convey current to the city, equivalent to a quarter of a million horse power, by two great feeder lines, carrying a current of 150,000 volts.

Metal Market.

Latest quotations: Standard copper, £72 12s. 6d. cash, £73 3s. 9d. forward; electrolytic copper, £76 cash, £77 forward; Straits tin, £170 7s. 6d. cash, £171 15s. forward; English lead, £22 2s. 6d. cash, £22 forward; bar silver, 33⅞d.; and fine gold 106s. The copper general outlook is brighter. In tin it is generally expected that the market will revive and prices increase. The lead market is heavy.

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The Week's Meetings.

RAND MINES.

In moving the adoption of the report and accounts at the annual meeting of the Rand Mines, Ltd., held in the Corner House on June 2, Sir Harry Ross Skinner, M.I.C.E., who presided, said: Dealing first with the balance sheet, on the debit side the capital account remains as before. The reserve fund stands at £2,344,193, being £230,551 less than for the previous year. The reduction is chiefly due, as stated in the balance sheet, to sums written off the company's investments where they stood above market value at December 31 last. You will realise that owing to the great fall in market prices which took place last year in gold mining shares consequent on the largely increased working costs, our holdings, particularly in some of the low grade mines, show a heavy depreciation. This the company is the better able to stand in consequence of the strong position of the reserve fund.

On the credit side, claims, water-rights, freehold properties, reservoirs, and pumping plant show a reduction of £44,693, and stand in the balance sheet at £130,567, which is chiefly due to the abandonment of 1,033 claims situated on the dip of the Jupiter and Simmer Deep companies. The two companies referred to are now in liquidation, and after full consideration of the results obtained by these companies and their inability to work at a profit, the board decided to discontinue the payment of the claim licences necessary to maintain title to these claims, which are situated to the south of areas showing very moderate values, and in which the reef is now proved to be at a very great depth.

Shares and debentures stand at £2,745,125, which is a decrease of £185,857 compared with the figure at the end of 1919. Whilst all holdings standing above market price at December 31, 1920, have been written down to that figure at that date, the amount at which the company's shareholdings are valued in our books (£2,745,125) is, in the aggregate, much below the market value at the close of last year or to-day.

The cash and cash assets, after allowing for all liabilities, amount to £627,766, which is £238,056 less than at the end of the previous year. Nevertheless, the company is still in a very strong position.

The profit and loss account shows that dividends on shareholdings amounted to £785,548, compared with £531,792 for the previous year, an increase of £253,756.

The income from reservoirs, interest and exchange, sundry revenue, etc., was £84,354, being an increase of £27,994, over the receipts of 1919.

On the other hand, the net profit on investments realised during the year was £32,333 as against £303,925 in 1919, a decrease of £271,592.

The total income for the year was £902,235 compared with £892,077 in 1919.

Administration and other expenses amounted to £39,229, a decrease of £6,280; and the net profit carried to appropriation account was £863,006, being slightly more than that earned in 1919.

Appropriation Account.

The appropriation account commenced the year with a credit of £865,822; add the profit for 1920, together with a small sum representing forfeited unclaimed dividends, £863,664; a total of £1,729,486, which has been dealt with as follows: Dividends aggregating 145 per cent. were declared for the year, £770,673; sums appropriated for new investments in excess of book value of investments realised amounting to £331,047—£1,101,720; leaving a balance of £627,766, which is a decrease, when compared with the amount brought forward at the end of 1919, of £238,056 accounted for as follows:—Net additional sum expended in new investments, £331,047; less difference between profits earned and dividends distributed to shareholders for the year, £92,991; total, £238,056.

The successful operations for 1920 permitted your directors to declare larger dividends than has been possible since 1917, mainly due to the increased price of gold which enabled many of the gold mining companies in which we are interested to pay higher dividends.

Throughout the whole of 1920 the gold mining industry had the benefit of a price above standard for their product, whereas during 1919 they benefited for approximately only six months. Since a free market has been available, the price has shown very considerable fluctuations. During 1920, the maximum increase over standard price was received in February, viz., 122.02 shillings per fine ounce (or 43.6 per cent. above standard) whilst the lowest was in June, viz., 104.43 shillings (or 22.9 per cent.) In December the average was 117.78 shillings or 38.6 per cent., but in January last there was a heavy fall to 109.46 shillings per fine ounce, and since that date a gradual reduction, until to-day it is in the neighbourhood of from 103s. to 105s. These variations synchronise with the rate of exchange between London and New York.

The position of the gold mining industry is most vitally affected by the present fall in the price of gold. Working costs are higher than ever, and the position of the poorer mines, in which category are included, the bulk of the gold mines on the Witwatersrand, is to-day very critical. The year 1920 must to a certain extent be regarded as abnormal, as the following figures pertaining to the mines of the Central Mining-Rand Mines group will show:

The tonnage milled, as compared with 1919, rose from 10,236,230 tons to 11,215,000 tons, an increase of 978,770 tons.

The fine gold recovered rose from 3,620,070 ounces to 3,748,748 ounces, an increase of 128,678 ounces.

Working revenue rose from £16,855,949 to £20,773,362, an increase of £3,917,413, which per ton milled is equivalent to 4s. 1.3d. or 17s. 8d. per fine ounce recovered.

Working Costs.

Working costs rose from £12,254,062 to £14,688,452, an increase of £2,434,390 or 2s. 3d. per ton milled or 10s. 8d. per fine ounce recovered, whilst working profits rose from £4,601,887 to £6,084,910, an increase of £1,483,023 or 1s. 10.3d. per ton milled, or 7s. per fine ounce recovered.

The following tables (based on tonnage milled) illustrate the continuous rise in working costs of late years for the mines of this group:

	Tons Milled.	White Wages.		Coloured Wages.	
		s.	d.	s.	d.
1915 . .	9,183,910	4	9.6	3	10.8
1916 . .	9,125,905	4	11.7	4	1.6
1917 . .	8,492,040	5	7.1	3	10.6
1918 . .	10,945,720	6	8.2	4	2.8
1919 . .	10,236,230	7	4.6	4	2.3
1920 . .	11,215,000	8	6.4	4	6.2
Increase on 1915:					
		s.	d.	s.	d.
1916 . .		0	2.1	0	2.8
1917 . .		0	9.5	dec. 0	0.2
1918 . .		1	10.6	0	4.0
1919 . .		2	7.0	0	3.5
1920 . .		3	8.8	0	7.4

	Stores and materials.		All other costs, inc. Head Office expenses.		Total.	
	s.	d.	s.	d.	s.	d.
1915 . .	5	8.3	3	8.3	18	1.0
1916 . .	6	0.9	3	9.6	18	11.8
1917 . .	6	4.9	4	3.9	20	2.5
1918 . .	7	6.6	4	2.2	22	7.8
1919 . .	7	10.3	4	6.1	23	11.3
1920 . .	8	5.3	4	8.4	26	2.3
Increase on 1915:						
1916 . .	0	4.6	0	1.3	0	10.8
1917 . .	0	8.6	0	7.6	2	1.5
1918 . .	1	10.3	0	5.9	4	6.8
1919 . .	2	2.0	0	9.8	5	10.3
1920 . .	2	9.0	1	0.1	8	1.3

These tables show that working costs in our group have risen from 1915 to 1920 by no less a sum than 8s. 1.3d. per ton milled (equivalent to an increase of 44.8 per cent.) of which white wages, exclusive of holiday pay, account for no less than 3s. 8.8d. per ton—or, in other words, the cost of direct white wages per ton milled has increased by 77.7 per cent.

Had this very large increase in wages been accompanied by a corresponding increase in efficiency, the position of the low grade mines would not be what it is to-day. Unfortunately, however, there has been no apparent improvement in efficiency, while the reduction in working hours has undoubtedly seriously affected the output per employe. It must be realised that mines are no exception to the general economic law; they cannot work unless their revenue is greater than expenditure. As soon as expenditure is greater than revenue, the only alternatives that remain to them are that they must increase revenue, decrease expenditure, or close down. It is abundantly evident that in the case of many companies, owing to the grade of their ore reserves, their survival depends on a decrease in expenditure, and such a decrease can only be effected by an all-round improvement in efficiency, which would be materially assisted by a diminution in the number of superfluous employes, coupled with an all-round reduction in wages.

The Cost of Living.

To-day we are faced with such a position on a considerable scale, and to prevent the premature closing down of many mines it is necessary immediately to consider all measures tending to reduction in working costs. The cost of living is to-day falling, and the general tendency of world prices is downwards. The alternative which faces the mine workers and the general community is decreased circulation of money with its attendant shrinkage of trade and consequent unemployment. No section of the Union population can remain unaffected by the result of an unsuccessful attempt at the solution of the problems with which the low grade mines are faced, although few realise the precarious position. It will be too late to put our house in order after the so-called gold premium is gone. The time to do it is now, and the Chamber of Mines has taken the initiative, and is at present negotiating with the representatives of organised labour on the matter of a reduction of wages.

Reverting to the subject of efficiency, it does not appear to be understood that, owing to the increased depth at which mining is to-day being carried on, and owing to the many difficulties due to the lengthy period many of the mines have been working, costs must necessarily show a tendency to increase. It is therefore not sufficient to maintain the efficiency that has been obtained in the past : it is actually essential to considerably improve that efficiency in order that the majority of the mines may be able to continue operations. You will remember that the Low Grade Mines Commission made many valuable suggestions with a view to assisting the low grade mines, but they have not, unfortunately, yet been acted upon by the Government, without whose sanction we are unable to adopt them. Improvement in efficiency must be striven for in all directions, whether it be in the direction of rearrangement of working hours, as suggested by the Commission just referred to, or in the more efficient use of rock drills or other mechanical appliances. There is, however, I regret to say, a tendency to resist the attempts of managements to secure improved efficiency. We do not yet seem to have overcome the pernicious doctrine of more pay for less work. Every device which enables work to be carried out more efficiently and with greater economy should commend itself to our workers, since whole-hearted co-operation on their part in every attempt to obtain better efficiency will go far towards making possible a profitable continuation of mining operations on a large number of mines which, without such improvement, must be faced with the necessity of prematurely closing down.

Reduction in Costs Must Come.

The longer a reduction in working costs is postponed the shorter the lives of many mines that are still making a profit to-day become. The increase in working costs of recent years has forced the mines to eliminate from their reserves, as unpayable, large blocks of low grade ore which, although they cannot be mined to-day except at a loss could be mined should working costs be lowered; the point that is not so evident, however, is that the longer they are left unmined the greater the chance becomes of their being lost for ever. These blocks get left further behind current mining operations, and they are very liable to be cut off by caved ground. The increased cost of again obtaining access to them will then, in very many cases, offset any reduction in working costs that may take place.

As regards stores, there are signs of reduction of this charge to working costs, and here again the best results can only be obtained through studying measures of economy.

Vast sums are paid by the gold mines to the Union Government and the Provincial Council in taxation. One need not dilate upon the economic influence of the Witwatersrand in the development of South Africa during the last thirty years, except to remind you that South Africa occupies the premier position in the world's gold production.

One realises that in the case of several of the older and so-called low grade companies shareholders can look for very little if any further return, but I submit that the economic value of mines which are able to continue working, even at a very small profit, is of immense importance to the country, more especially to-day when the world is still struggling to recover from the enormous confusion created by the late European War.

Government we know must have revenue in order to carry on, but the Union Government, in order to secure the continuation of its vast revenues from the Witwatersrand, must be prepared to consider sympathetically all measures through which relief may be given to companies which are struggling for existence. The problem is one which affects every citizen of the Union.

The Coal Question.

Investigations in conjunction with The Central Mining and Investment Corporation, Ltd., for the acquisition of coal mining interests have progressed satisfactorily. Up to the present over 270 separate farms in the Transvaal and Natal have been inspected. As a result an area of approximately 8,500 acres in the Witbank district has been acquired on the farm Wolvekranz, and extensive drilling has disclosed the existence on this area of wide seams of coal easily worked and of excellent quality.

Two other areas in the Witbank-Middelburg district, totalling approximately 13,000 acres, have also been acquired under satisfactory lease arrangements, and when conditions become more stable, consideration will be given to opening up one or more of these three areas as coal producers.

Investigations into the coal deposits of Natal have not encouraged us to acquire any interests in that province, and we are of opinion that the coal areas we have secured in the Witbank-Middelburg district are sufficiently promising to allow us to confine our activities to this neighbourhood.

Native Labour.

The native labour force of our companies has varied seasonally as usual. At the end of 1919 we had in our employ 69,200 natives. The number rose in June, 1920, to 80,506, and thereafter fell until December, when the number was 76,755, whilst in March of this year the number rose to 84,177.

With regard to tropical natives, the Government has not yet sanctioned the reintroduction of this class of labour even in an experimental form.

Some years ago, it will be recalled, a number of natives from districts north of latitude 20 deg. south were employed on these fields. Unfortunately the mortality amongst them was so high that their further employment was prohibited by the Government in May, 1913. Since that time, however, such advances have been made in medical science, in sanitation and in the general housing and feeding of natives that the consensus of medical opinion is that natives brought from north of latitude 22 deg. south would be found as healthy and hardy as natives from our present sources of supply.

There is no need to elaborate on the advisability of the experiment being made, as not only would their introduction be a steadying factor in the supply of native labour for the mines, but a means of liberating from mine work a certain number of labourers for farming and other industries throughout the country.

The low grade mines commission placed the importation of this class of labour amongst the chief of their recommendations, and their views upon this point were emphatically affirmed by the Unemployment Commission appointed by the Government.

The health of our native employes has received unremitting attention during the year. Influenza has continued to claim numerous victims, and the prevalence of this disease amongst the natives is thought to be due to the unsatisfactory condition of food supplies in certain territories of the Cape Colony. This is also reflected in the existence of scurvy which was more prevalent during 1920 than in the year before. Actually influenza was responsible for 4.49 deaths per thousand amongst our native employes.

The mortality from all diseases during 1920 was slightly higher than in 1919, the figures being :—

1920, 13.95 per thousand; 1919, 13.1 per thousand.

It is satisfactory to note that the mortality from pneumonia in the group was only 1.4 per thousand, from tuberculosis 1.45 per thousand and from accidents 3.08. Including accidents the total mortality from all causes was 17.02 per thousand. Certain changes have recently been effected in the diet of natives, which it is confidently anticipated will result in a reduction of scurvy, and further research work is being carried on in connection with this disease.

Our central native hospitals have proved more than satisfactory. Native female nurses continue to be employed, and it is evident that the training of such people is not only for the good of the natives on the mines, but also is becoming of great and growing importance to the native population of the country generally. Further co-ordination of the work of our medical staff has taken place, and we welcome the formation of an association of mine medical officers holding native appointments which meets regularly to discuss the special problems connected with their work.

I have to again record our appreciation of the very valuable and devoted work carried out by our medical services department, as also by our medical officers on the various mines.

Miners' Phthisis.

Although the latest report of the Miners' Phthisis Board has not yet been issued, it is understood that the incidence of miners' phthisis for 1920 shows a material decrease. A special Commission appointed by the Union Government has recently submitted a report, but this report is not as yet available. I trust its findings will remove various anomalies.

Refinery.

The refinery, the building of which was started in June last year is approaching completion. It will be capable of refining some ten million ounces of gold per annum, and is expected to commence operations in October, though naturally during that month it will only be able to refine small experimental lots, gradually increasing until in December it is hoped to refine about 70 per cent. of the present output, and, early in the new year, the whole output of the Witwatersrand.

The main object of this undertaking is, of course, to reduce our realisation charges, but it is hoped and expected that an additional advantage will accrue to the industry through the greater flexibility that will thus be introduced into the conditions obtaining for the disposal of our product.

Taxation.

Although some measure of relief has been experienced through the discontinuance of the special war levy through effluxion of time this has been nullified by the raising of the normal tax from 5 per cent. to 7½ per cent. In the House of Assembly a Bill has passed its third reading which will prohibit Provincial Councils from imposing direct taxation on the profits derived from mining operations, or in respect of rights in or to mines or minerals. The Bill also provides that the Ordinance of the Transvaal Provincial Council which imposes a tax on the profits of gold shall cease to be in operation on March 31, 1922. When the above Act becomes law the anomaly of the gold mining industry being singled out for special taxation will have been removed

A matter of the utmost importance to the gold mining industry was the election which took place in February last, as a result of which General Smuts found himself returned to office with a substantial majority over all other parties. We do not look for any favours from Government, but we do expect that the authorities will afford us the reasonable and just treatment that the importance of the industry deserves. Owing, no doubt, to the political troubles and difficulties of the last few years, our needs have received scant consideration from the authorities, but I venture to hope that with the strong Parliamentary backing now enjoyed by the Government, these troubles and difficulties will be replaced by a period of tranquillity which will enable Ministers to devote proper attention to the industry that is the mainstay of the country's economic life.

Our various technical departments have carried on a great deal of valuable work during the past year. The metallurgical department has been responsible for further economies in the consumption of cyanide and zinc. Experiments are also being conducted for the de-aeration of solutions in order to reduce the amount of oxidisation of zinc.

The electrical and mechanical staff also has carried out much important work in connection with the equipment of our mines, especially investigations into the type of rock drills most suitable for the varying work of the mines, and also into their economic use and control.

The supply of air and electricity to our mines from the Rand Mines Power Supply Company, Limited, and of electricity from the Victoria Falls and Transvaal Power Company, Limited, has been satisfactorily maintained.

The board desires to express its recognition of the services rendered by the staffs of the head office and at the mines.

The directors' report, balance sheet and accounts for the year ended December 31, 1920, being received and adopted, the meeting closed.

UNION CORPORATION.

The ordinary general meeting of shareholders of the Union Corporation, Ltd., was held in the board-room, 94, Main Street, on June 3, Mr. M. McCormack presiding.

The Chairman said: Our net profit for last year of £190,074 compares with the higher amount of £237,917 for 1919, but it comes midway between that amount and the £145,380 of 1918. Our income from dividends (our steadiest form of revenue) has further advanced, but the year, unlike 1919, was unfavourable for other profitable business. The falling off in profit, which I think is moderate under the conditions which ruled, is due mainly to smaller share market operations and to writing off the greater part of the year's expenditure on prospecting, etc., in Mexico. You will see that, while we write off this amount, we leave the exploration reserve account intact.

We again place £40,000 to reserve account. We have distributed a dividend of 2s. per share, or £140,000, which is the average of the rates paid for 1918 and 1919, and add £10,074 to the amount carried forward. It is pleasing to note that in the past four years we have accumulated out of profits £193,355, which appears partly as reserves and partly as carry forward. In addition, as is stated in the report, our shareholdings at present market prices show a very substantial surplus over the sum at which they stand in the accounts.

The excess of cash assets, Government securities and sundry debtors over liabilities is £119,004. Our share and debenture holdings and sundry participations and interests have increased by £54,678 to £1,063,428. Temporary advances against securities have been reduced from £326,635 to £115,264, while holdings of British Treasury Bills and Government stocks have correspondingly increased from £141,726 to £377,541, which is the natural result of the falling off of activity on the Stock Exchange.

Price of Gold Decline.

At your last annual meeting, Mr. Newhouse, when referring to the gold premium and exchange position, informed you that in February, 1920, the price of gold per fine ounce reached 127s. 6d. and that, thereafter, the premium fell away until in June following the average price was only about 103s. 6d. Simultaneously with the depreciation in sterling exchange as expressed in dollars, the price of gold again improved to 121s. 4d., but since November last has fluctuated with a downward tendency, and is now about 105s. As you are aware, the exchange position also fluctuated very considerably during the year under review. While at the beginning of 1920 the price of gold was high and the rate of exchange low, about the middle of that year the position was reversed.

In the closing months of the year, however, the gold mines again obtained a higher price for their product, and, at the same time, received the further advantage of a premium for drafts on London. To-day the exchange for sight drafts on London is 1¼ per cent. discount. With regard to the gold premium, there are some who hold the opinion that it may again rise when North America pours a portion of its harvest into England in the autumn, and this view may prove to be correct. But that the premium will be variable and that it will vanish after some time seems inevitable, and it must, therefore, be regarded only as a temporary economic factor in the life of this industry. There must also inevitably ensue a fall in wages, stores and other costs of production.

Gold Profits Tax.

Recent Union legislation has divested the Provincial Council, after the end of this year, of the power which it formerly possessed to impose a gold profits tax on the Rand gold mining industry. The special war levy of 6d. in the £, which was included in the dividend tax, automatically disappeared at the beginning of this year, but, the Union Parliament has now decided to enact that, in the case of companies, the normal income tax shall be increased from 1s. to 1s. 6d. in the £. The effect of these legislative changes leaves the gold-mining companies in practically the same position, as regards taxation, as they were in during 1920, but, in the case of your corporation, which was not liable for the special war levy, you will have to pay an additional 6d. in the £ on that portion of your profits which is subject to income tax in the Union of South Africa.

As you are, of course, well aware, by far the largest part of the corporation's present interests are centred in the Rand gold mining industry. The two companies which are of special and particular importance to the corporation to-day are the Modderfontein Deep Levels, Ltd., and the Geduld Proprietary Mines, Ltd. As the recently issued reports of these two companies show, they are both progressing most satisfactorily. A few remarks regarding each of them, in addition to those made at their annual meetings, may be of interest.

A War Time Mine.

Firstly, as regards the Modderfontein Deep Levels. Since its reduction works were started in December, 1914, it has produced gold to the value of £5,783,071, taking the metal at its standard price only. Adding to this the premium obtained since the South African gold mining industry was allowed a free market for its product, the total value realised on gold account was £6,220,861. Sundry revenue during the same period amounted to £38,938, making the total revenue of the company to December 31 last £6,259,799. Out of this sum £6,096,335 has been absorbed as follows:

Working expenses (wages, stores, etc.)	£2,591,590
Capital expenditure	127,429
Taxation	571,742
Depreciation and sundry other expenses	80,574
Dividends	2,725,000
Total ...	£6,096,335

and at the end of last financial year the company had an unappropriated balance of £163,464.

This, I suggest, gentlemen, is an excellent record for a mine with a capital of only £500,000. In 1920 the value of the gold produced was £1,138,961, taking it at the standard price; adding the premium, which, as you know, fluctuated considerably, the amount was £1,466,595, and with working costs at £575,287, there was left a profit of £902,165, including sundry revenue. The net profit, after providing for taxation, etc., was £727,842, out of which half-yearly dividends of 60 per cent. and 85 per cent. respectively absorbed £725,000, leaving, with the amount brought forward from the previous year, an unappropriated balance of £163,464, as already stated, which has been carried forward to the current year.

The results obtained during the first five months of this year show no appreciable change as compared with the corresponding period of 1920. It is evident from the published reports and accounts that the Modderfontein Deep Company, from a mining and financial point of view, is in an exceptionally strong position.

Increase in Ore Reserves.

With regard to the Geduld Proprietary Mines, out of a total profit of £406,015, two dividends amounting to 17½ per cent. absorbed £205,296; £50,000 was appropriated to meet a portion of the total capital expenditure of £131,759, £37,577 was spent on excess development, and £61,319 was paid away almost entirely on taxation, the amount carried forward being increased from £3,723 in 1919 to £55,547 last year.

Owing largely to the excellent development in No. 7 level area, the ore reserves of the mine, as recalculated at the end of last year, showed an increase of 640,000 tons, while the average value improved from 7.4dwt. to 8dwt. per ton over a stoping width of 61in. Your consulting engineer informs me that the new No. 7 shaft will strike the reef this month, and that the crosscut between that shaft and the rich No. 7 level area will be completed next month. The development, not only in the No. 7 level area, but also in the other sections of the mine which are being opened up is satisfactory. In the No. 7 level area to which special reference is made in the consulting engineer's report, the total footage sampled to the end of May is 4,545, of which 65 per cent. is payable and averages 16dwt. over an estimated stoping width of 66in The claim area of the property is very extensive, and, as you know, there are large portions of it still to be explored.

There is no material difference between the profits earned during the past five months and those of the corresponding period of last year.

The Princess Estate Mine was, you will remember, closed down in May of last year, and almost the whole of its machinery and plant and stores have since been sold. The remaining movable assets of the company, which are not considerable, will be disposed of as soon as possible, and the directors are considering the placing of the company in liquidation.

South American Interests.

During the year we have increased our interests in Mexico. That country, as you know, has been for many years under a cloud, and we have not drawn any profits from it, but, with the more stable Government now existing, the position may easily change. The better political aspect has, however, coincided with an exceptionally large decline in the prices of metals. This decline has carried them down to the pre-war level, while the prices of materials generally, which have also decreased largely are, nevertheless, still 50 per cent. above that level. Wages and other expenses are falling, but, from the nature of things, they lag behind this quick decline in metal quotations. Economic conditions seem bound in time to adjust themselves, and the establishment of a proper relationship between prices and costs should bring Mexico into the prominent position it deserves as a land of large mineral resources.

The San Francisco Mines of Mexico made a fair profit for its last financial year with the present small plant, but the drop in metal prices has produced small losses since. It is, however, reckoned that when the new 250-ton-a-day plant is in operation, which should be the case from January next, fair profits will be made even on the present price level, and, of course, much better profits with any improvement in metal quotations. Development is in a backward condition, but, pending the erection of the new plant, milling of ore from the reserves will be suspended and development pushed forward, so that by the end of the year the position should have improved materially in this respect. During the remainder of this year moderate profits are expected to be made by re-treating the 43,000 tons of residues, on which all mining and milling charges have already been paid, and also by milling certain carbonate ores from the upper levels not included in the ore reserves.

Managing Director Honoured.

You will have heard with pleasure of the knighthood conferred by His Majesty on our managing director for services to the Union of South Africa. The scheme for the formation of a central reserve bank for the Union, with which he had much to do, has been passed since we last met, and the bank will soon be in operation with, we hope and trust, considerable benefit to this country. Sir Henry Strakosch, as Chairman of the Financial Section of the Provisional Economic and Financial Committee of the League of Nations, has the opportunity of rendering much useful service in the rehabilitation of the position destroyed by the war.

As he announced at our last meeting, Mr. H. Newhouse resigned his position as manager of the Corporation in Johannesburg as from March 31 last, after being connected with us for the long period of over twenty-three years. I, his successor, should like to take this opportunity of expressing on behalf of the board their regret at losing his valuable services and to wish him every success in the future.

We all remember, and deeply regret, the death last September of Mr. F. W. Forbes, who so ably served your South African group of companies in the capacity of buyer for over fifteen years.

In conclusion, I wish to express the directors' appreciation of the good services rendered by the management and staff, both in Europe and South Africa. The measure of success attained by the Corporation is due to their efficient co operation in its many activities.

The resolution having been duly seconded was put to the meeting, and the adoption of the report and accounts was unanimously carried.

Mr. Joseph Temperley was re-elected a director and Messrs. Price, Waterhouse and Co., and Messrs. F. W. Diamond and English were re-appointed auditors.

S.A. TOWNSHIPS.

A Prosperous Year.

At the annual meeting of the S.A. Townships, Mining and Finance Corporation, Ltd., Mr. Julius Jeppe, C.B.E., the chairman, referred to his remarks last year on the difficulty of developing the townships belonging to the corporation owing to the enormous increase in the cost of materials and labour and the decreased efficiency of the latter. He trusted that it would not be long before the artisans in the building trade would realise the truth of the fact that the cheaper houses can be built the more work there will be for them and for those out of employment. The policy of restricting output to provide work was in the nature of a boomerang, and soon hit very badly those who pursued it.

The capital of the corporation remained at £974,616, the last dividend of 10 per cent. accounting for an amount of £99,802. A considerable number of farm properties in the Transvaal had been sold, but nearly 500,000 acres had been purchased in Southern and Northern Rhodesia.

In order to provide office accommodation their directors had purchased during the year the whole of the shares in Farrar's Buildings, Ltd., and they intended to remove there as soon as the present tenants vacated the building. Dealing with the item "Bonds and Loans," Mr. Jeppe said that this showed a large decrease of £52,810, which showed that they had been successfully reducing their outstandings.

The gross profits during the year amounted to £355,589, the result of the first complete year's operations since the amalgamation. The expenditure incurred in obtaining this result was £65,911, leaving £289,677 to be carried forward to the appropriation account, which, after deducting dividends and certain other amounts, is carried forward to the current year in an amount of £265,648.

Mr. Jeppe then proceeded to deal with the position in the various industries in which the corporation has interests.

The retiring directors, Sir Abe Bailey, M.L.A., and Mr. W. J. Gau, were re-elected.

Messrs. C. L Andersson and Co. and Mr. L. B. Chesterton were reappointed auditors.

LEEUWPOORT TINS.

REVIEW OF SATISFACTORY YEAR.

The annual general meeting of the shareholders of the Leeuwpoort (African Farms) Tin Mines, Ltd., was held in the Board Room, Jeppe Arcade.

Mr. Julius Jeppe, C.B.E., chairmon of the company, presided, and 136,909 shares were represented out of an issued capital of 275,000 shares.

In moving the adoption of the report and accounts, the chairman alluded to the pleasing fact that the operations during 1920 were much more satisfactory than those of 1919, due not only to the increased price of metal but to the greater tonnage crushed. This had allowed the board to declare two dividends, amounting to £41,250, equalling 15 per cent for the year.

The ore tonnage was practically the the same, but the average value of 2.40 per cent. was an increase of 0.18 per cent. over 1919, which was in its turn an increase of 0.27 over that of 1918. The working expenses compared with those of last year show a decrease of 2.34 per ton milled. This, the chairman pointed out, was especially statisfactory, having in mind that the cost of stores and wages had continued to advance. The total mining revenue for the year was £172,205, an increase of £38,836.

Waiting for Native Labour.

I should like to mention, continued Mr. Jeppe, that during the year, at a time when the labour force was good, we again experimented on the treatment of the large area of alluvial deposit which exists on your property. During three months August to November we treated 1,112 short tons, from which we recovered 1,167lb. of black tin of about 65 per cent. metallic tin grade at the end of this period, however, we were forced to discontinue operations owing to inability to obtain sufficient native labour. It was, nevertheless, proved to be satisfaction of your manager that this large area of alluvial deposit can be profitably worked, given a reasonable market price for the metal.

During the last quarter of 1920 tin fell from £265 to £200 a ton, and in the current year it continued to fall practically without interruption until it touched £139, on March 10. Before it had reached this price, however, operations on your property had become unpayable, and as soon as the board was satisfied that these low prices were probably going to last for some time it decided to close down crushing operations in order to conserve the financial and mineral resources of your mine; this was done on February 14, and since that date work on your property has been confined to development and to treating the accumulation of vanner tailings, amounting to over 10,000 short tons, which latter can only be done when the mill is not otherwise engaged.

Cheaper Than the Chinese.

Mr. Jeppe intimated that the mine would be reopened when the board was satisfied that any recovery in the price of metal was not merely of a temporary nature. Since March 10, when the low figure of £139 was recorded, prices have advanced to £180 to-day, but even at the latter figure few mines could show a profit. It had been recently proved that even in the Malay States the Chinese could not produce tin at £230, and the Cornish mines were still less able to do so. This decreased production, Mr. Jeppe held, must, when the trade demand becomes more normal, result in a healthy market and increased prices.

The adoption of the report was unanimously agreed to by the meeting, and the retiring directors, Mr. Jeppe and Mr. O. G. Gill, were re-elected.

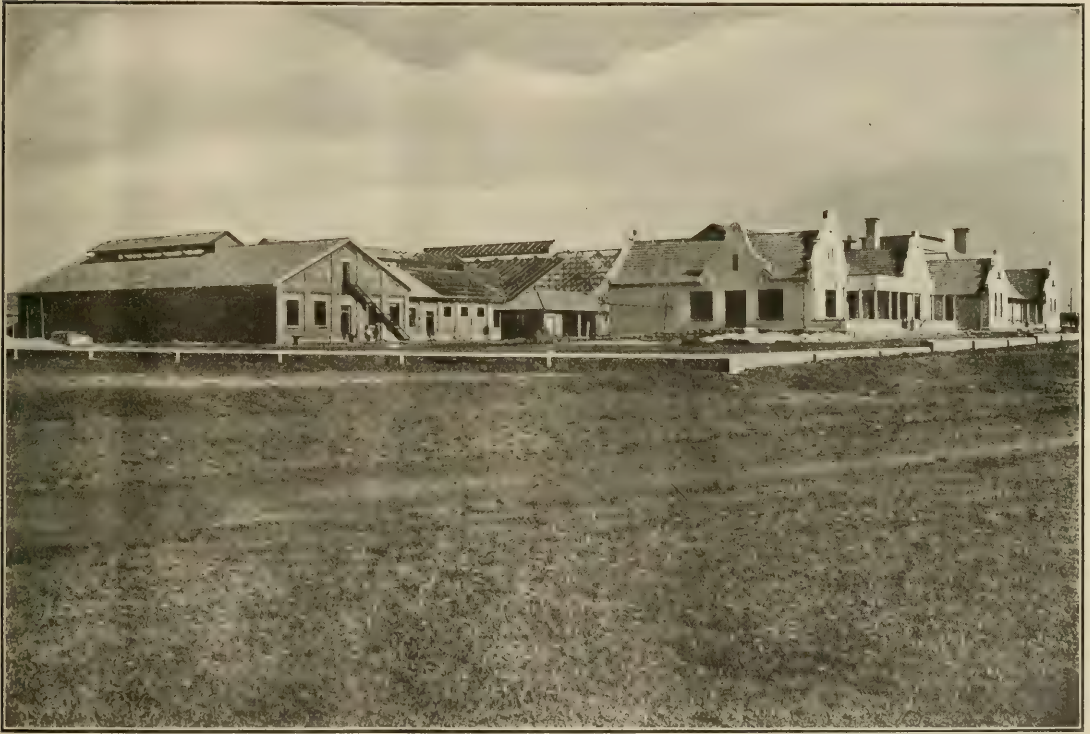
The statement of accounts and balance sheet for the year will be found in tomorrow's columns of "The Star."

The South African
Mining & Engineering Journal
THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.
Established 1891.

Vol. XXXI., Part 1. JOHANNESBURG, TRANSVAAL, SATURDAY, JUNE 18, 1921. No. 1551.

The Rand's Gold Refinery.

THE INDUSTRY'S LATEST ASSET.



The above photo shows the Rand gold refinery near Germiston. A substantial wall is being erected around the buildings.

It savours of an anomaly that this refinery should almost be completed at a time when the mining industry is face to face with a crisis and when the days of many of our most prolific producers appear to be at an end. In this number of the "Mining Journal" the dangers of the present position are fully discussed, and we herein publish numerous interesting articles on the prospects of prolonging the life of the industry by exploitation of the reefs which underlie and overlie the Main Reef series and those which occur in the outliers of the Rand.

Big Houses and Komati Coal.

TWO CORPORATIONS INTEREST THEMSELVES IN THE KOMATI POORT COAL FIELD—AN IMPORTANT DEVELOPMENT—A BIG ADVANTAGE OVER WITBANK IF VALUES ARE GOOD—BORING OPERATIONS TO BE COMMENCED.

We have received information from a wholly reliable source in regard to an enterprise which, if successful, may have a most profound influence on the coal mining trade of the country.

Coal has for long been known to occur in the valley of the Komati River, but hitherto no very determined effort has been made to exploit the seams. Some considerable time ago the Railway secured a coal reserve in this area, and at various times individuals and syndicates have associated themselves with this coal field which, by reason of its adjacency to the Portuguese border and the coast, has naturally enough presented many attractive features.

A Move from Johannesburg.

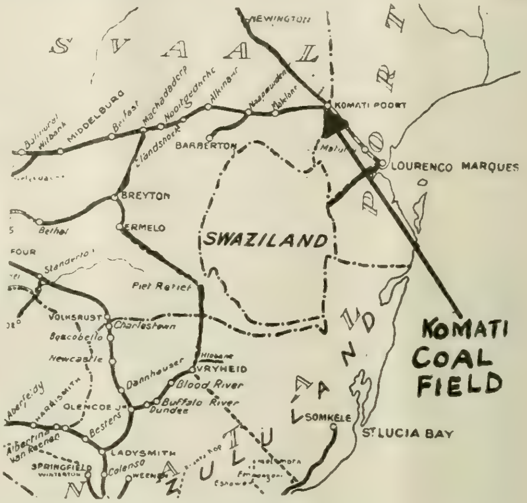
No big move in the direction of Komati Poort has, however, been made by the big Transvaal coal interests until just recently. A week or two ago two of the leading mining corporations of the Witwatersrand secured large coal-bearing areas in this locality.

Large Areas Obtained.

The area secured in respect of one corporation is of 2,639 acres and in respect of the other 2,200 acres. We understand that options over additional ground are being secured and that boring operations are commencing almost immediately. It will, of course, be evident that the possessors of coal at Komati Poort will, if average calorific values are obtained, have a big pull over producers situated further away from the coast.

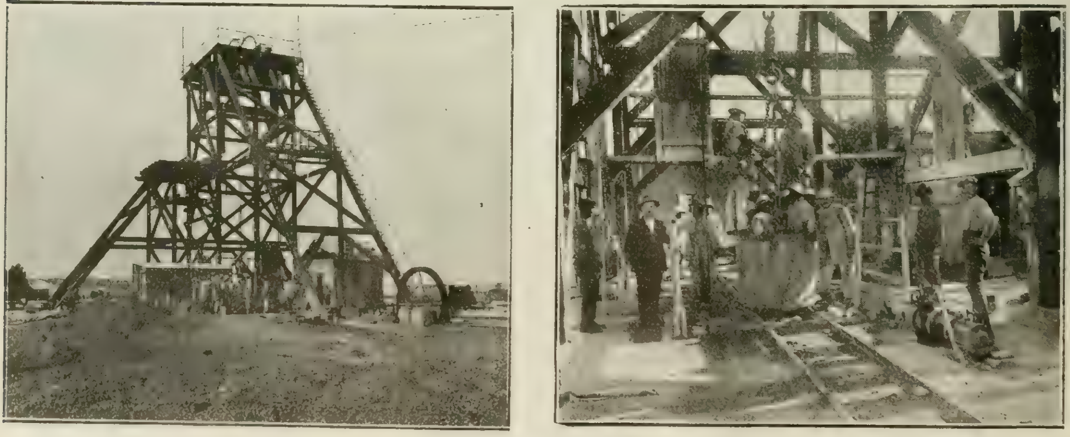
Komati Poort is situated only 58 miles from Delagoa Bay, and it is estimated in some quarters that Komati coal would have an advantage of something like 8s. per ton over the Witbank Collieries. These facts no doubt account for a quite understandable desire in certain interested quarters to keep quiet the news regarding recent activities in the Komati field by influential Rand firms.

The areas secured by the two corporations are situated between the railway and the Komati river and are distant about seven miles from Komati Poort station.



Map showing position of the Komati coal field in relation to Witbank and Lourenco Marques.

Two Views at the Headgear South Shaft City Deep



An interesting reference was made at the City Deep meeting held a few days ago to the new South Shaft which was down 3,200 feet on April 30. It is to be 7,000 feet deep in two stages.

WANTED A NEW RAND.

JOHANNESBURG FACE TO FACE WITH A CRISIS—THE DECLINE OF THE MAIN REEF MINING INDUSTRY—THE SPECTRE OF UNEMPLOYMENT AND RUIN—WHAT IS JOHANNESBURG TO LIVE ON?—HOW THE POSITION MAY BE RELIEVED—A REEF CONFERENCE CALLED FOR—GOVERNMENT INTERFERENCE WITH PRIVATE ENTERPRISE DEPRECATED—LESS BURDENSOME CLAIM LICENCES WANTED—A PLEA FOR THE DESPISED BEDS OF THE WITWATERSRAND FORMATION—TESTIMONY OF PIONEERS—NEW MINES WANTED TO REPLACE DECLINING VENTURES—THE FUTILITY OF ACADEMIC GEOLOGY—REDUCED WORKING COSTS, INCREASED EFFICIENCY, AND EXPLOITATION OF NEW REEFS THE SOLUTION.

In this issue of the "Mining Journal" a special effort is made to awaken the Government of the country and the public generally to the critical state of the Rand mining industry, from which the bulk of the revenue of the country is derived. It is asserted that with the decline of the Central Rand mines Johannesburg will sink into the insignificance of a dorp, that the revenue of the whole country will be very seriously lessened, that greatly increased taxation which will fall heavily upon the whole community will be the inevitable result, and that the credit and trade of the Union as a whole will be most seriously affected. This journal urges the exploitation of the various reefs which underlie and overlie the Main Reef series, which are known to contain payable values in some sections. It asks for a remission of claim licences and sympathetic treatment for the prospector. It contends that there should be no interference from the Government Department of Mines with people who are endeavouring to open up new mining propositions, and points out that the only prospects of salvation for the Rand are those offered by the reduction of working costs and increase of labouring efficiency, and more especially by means of the exploitation of new gold mines which will help to take the place of the declining ventures.

The question repeatedly has been asked in this journal whether Johannesburg with a white population of 150,000 and with nearly a third of a million inhabitants, European and coloured, in its far-flung Municipal boundaries and environs is going to last, or whether it will go the way of Coolgardie and other glorified mining camps and is to fade into a poverty-stricken insignificance.

We of the capital city of the Witwatersrand are situated on no trade-bringing coast board. Johannesburg is not even builded on the banks of a river as nearly every other large town in the world is situated, and it is exceedingly doubtful whether we can live on the reflected glory of the Far East Rand. Neither are the prospects of existing on the somewhat illusory ideas of distributing centres, head office administrations, and local industries attractive

A Precarious Position.

These so-called local industries are merely supported by the mines, and when the mines cease production the industries will not survive. And it has yet to be proved that the money which comes into our coffers through the channels of headquarters administration and trade distribution will suffice to maintain nearly a quarter of a million people.

The sober facts are that the majority of the mines of the Central Rand are well-nigh exhausted. Fortuitous circumstances, such as were referred to in this journal several months ago and were more recently mentioned by Mr Samuel Evans in his masterly speech at the Crown Mines meeting, may come to the rescue. We should leave no stone unturned to bring the immense tonnages of low-grade ore which exist on the Rand within the scope of profitable working. Herein lies one direction in which the salvation of Johannesburg may be sought. But of even more importance than concentration of effort on a campaign to reduce costs and increase efficiency so that low-grade tonnages may be worked at a profit is the desirability—nay the necessity—that exists for the thorough proving of the various auriferous zones of the Witwatersrand which hitherto have been disregarded simply because the predominance of the Main Reef series has cast the various underlying and overlying reefs of our auriferous tract into insignificance.

In Eight Years' Time.

The statement that, if things go on as at present, in eight years' time the Crown Mines and the City Deep only will be at work between Randfontein and Benoni is no exaggeration of a self-evident fact that will be palpably clear to all unbiassed investigators of the problem of the Rand's future. And it is therefore imperative that everything in our power should be done to replace the mines which are now in the late evening of their lives by new mines—right here on the Central Rand section, as well as on the outlying wings of the original gold field.

The seriousness of our present position can scarcely be exaggerated. We understand that the Mayor of Johannesburg has been requested to convene a meeting of the Mayors of Reef Municipalities, Presidents of Chamber of Commerce, Chamber of Mines, Chairman of Federation of Industries, Mine Workers' Union, and other public bodies to consider action by means of public meetings and other ways to bring home to the Government the necessity for taking action before Parliament rises in order to arrest the economic catastrophe with which the Rand gold mining industry, and consequently the whole country, is threatened. Owing to the crushing burdens of claim licences under the Gold Law and the worrying and unnecessary regulations which weigh on all prospectors and prospecting enterprise, all progress has been killed and all new ventures have ceased. In some quarters it is demanded that the present Government Department of Mines should be reorganised, that interference by officials with private enterprise—like that of the cables to the High Commissioner of last year, which prevented a large amount of working capital being secured for the opening up of Heidelberg should be repudiated by the Government. It is, too, contended that the burden of claim licences exactions should be completely taken off all developing mining enterprise and that the State pay the owners' share of licence moneys meantime until the production of profits stage is reached; and generally it is required that immediate steps be taken to make it possible for private enterprise to open up new gold fields in the extensions of our great gold-bearing reefs which recent discoveries have proved, and so obtain new outcrop mines to take the place of the dying mines and thus save the Rand and South Africa from financial and industrial ruin.

As instancing the present calamitous state of the country, a correspondent points out that "railway revenue has already fallen greatly below the Budget estimates, and that with the narrowing of the basis of taxation rates must rise in every direction and a 6s. income tax is on the way. The rich mines, too, will feel it because there will be nothing else left to tax and a 10s. profit tax is quite possible on such mines. The only remedy is to widen the basis of production."

New Mines for Old.

The prospects of opening up new and profitable ventures on the Witwatersrand are not nearly so hopeless as some people believe them to be. Public prejudice has prejudged the values of the quartz and conglomerate beds which lie below and above the Main Reef series horizon on data which in our opinion are unreliable and insufficient to justify the widespread belief that the footwall of the Main Reef and the hanging wall of the South Reef are the farewell rocks of profitable mining in the Southern Transvaal.

Reefs of the Early Days.

The Rand owes its discovery to the finding of gold in the auriferous quartzites which lie between the conglomerates and the basal granite. And for some years after the discovery of the Main Reef series profitable returns were secured by mines which worked banket beds lying above the horizon of the Main Reef series. But latterly public opinion has been shepherded into the narrow channel which lies immediately to the south of the towns of Johannesburg, Germiston, Boksburg, Langlaagte and Roodepoort, and the average man in the street, if asked about the North Rand gold-bearing quartz reefs or the conglomerates assigned to Kimberley and Black Reef series will, with very little knowledge of the true facts tell you that these reefs are unpayable.

WILL JOHANNESBURG LAST?

A Street Scene in the Golden City. Johannesburg has been reared up on the industry of the auriferous conglomerates which lie to the south of the town. This article discusses ways and means of prolonging the life of the industry after the exhaustion of the old Central Outcrop properties.

Popular Prejudices.

He will tell you that they *must* be unprofitable, otherwise they would be exploited by the big mining houses, and he will, if he knows his history of calamity fairly well, refer to the several debacles which have cost the public hundreds of thousands of pounds in such escapades as North Rand Gold Mines, Coronations, Columbus Syndicates, and a host of other ventures the scrip of which reposes forgotten and condemned in many a broken-hearted deed box.

But despite the fact that all, or nearly all, of these ventures which have sought to win gold from reefs situated outside of the boundaries of what is termed the legitimate Rand have so far proved failures, there is much evidence to support the view that unsound methods of finance and technology and a pandering to Stock Exchange speculation have in large degree been responsible for past failures.

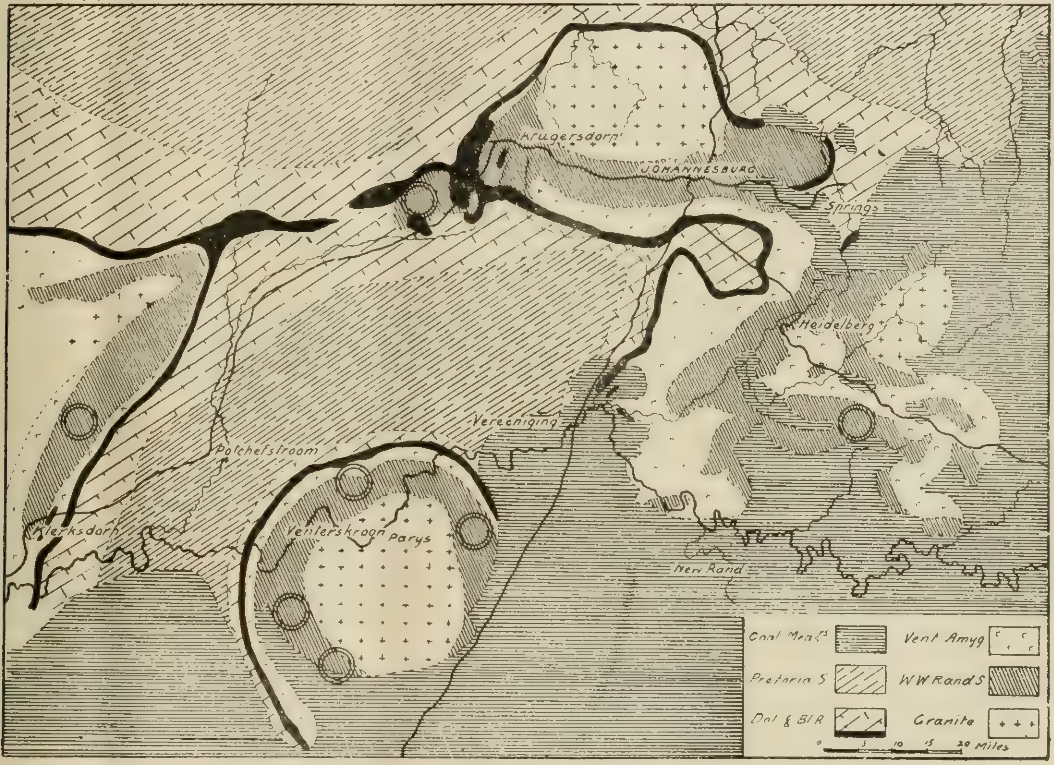
Pioneer Testimony.

The testimony of pioneer witnesses, the evidence of men who prospected the Rand years before the great Main Reef boom and the advent of the cyanide process (without which the Rand would never have been a great gold field), cannot be disregarded in this matter. The views of Mr. William Struben, of Mr. W. P. Taylor, of Mr. Scott Alexander, and Mr. W. E. Bleloch, which find expression in this issue of the journal and are at least worthy of careful perusal.

These gentlemen have not perhaps the useless bees in their bonnets that some people think. We must always remember that lack of adequate funds has compelled many of these off the Main Reef enterprises of the Witwatersrand to cease operations when water was encountered. Neither should we forget that in the early days not a few of these ventures were closed down when pyritic ore was met with, and their ores have never had a fair trial with modern metallurgical methods.

Not a few of them have been condemned because of unfavourable results secured by diamond drills. We need hardly remind our readers that boreholes generally are not regarded as reliable indicators of value. As against these popular beliefs that the underlying and overlapping reefs of the Witwatersrand are unprofitable, we may set the highly interesting statements made by Mr. Struben as to the heaviest gold being to the north and in regard to the excellent values secured both above and below the Main Reef series in the years gone by. We may, too, emphasise Mr. W. P. Taylor's remark that at the commencement of its immensely prosperous career the great New Modderfontein mine had far less to show than many a North Rand prospect has at the present day.

Then, too, there are the comprehensive stratigraphies of Mr. Scott Alexander, who for years has insisted that we live upon a golden age greater and more far flung than the wildest dreams of avarice. And there is, too, the conviction of Mr. Bleloch that we have misread the geology of this great auriferous tract and that whilst the grim spectre of unemployment grows in our midst Government persecution, big house hostility, faulty expert reasoning, and public ignorance are all combining to blind our eyes to the existence of many millions of tons of "Van Ryn Reef—the richest on the face of the world."



Where new Gold Fields may be exploited. Geological Map of the Southern Transvaal, showing outlying areas.

Voices Crying in the Wilderness.

These voices which have for so long cried in a wilderness of apathy demand that we should hear them, if only for the sake of our own daily bread, which as surely as the sun will set to-morrow will be denied to many thousands of us when the old Central Rand section of the Main Reef series is worked out, as 90 per cent. of it will be in a few years' time, unless new avenues of employment are exploited. It is absolutely imperative that public opinion should be aroused to the necessity for a thorough unbiassed and competent investigation into the merits of the reefs which underlie and overlie the banket beds of the Main Reef series and also of the gold-bearing formations which lie to the south-east and south-west and south in the Heidelberg, Klerksdorp and Vaal River districts.

It is absolutely imperative that the Government of the Union of South Africa (a country which must stand or fall with the mining industry of the Rand) should assist mining enterprise on the lines indicated in this article and instead of exacting ruinous claim licences from companies and individuals endeavouring to prolong the life of our gold fields should, through the medium of a revised and more business-like mining law make the prospecting and the opening up of new gold mining ventures on the Witwatersrand beds an attractive business. And we must have a Government which instead of frightening capital away from the Rand by means of cables will help to attract money to the country for legitimate mining enterprises. Similarly we want a geological department that is of real economic value to the country. Erudite and academic treatises in petrology and stratigraphy are all very well in their place, but we would far rather see a few new mines, even if they are only ten or twelve stamp propositions, opening up on our despised and not fully tried auriferous annexes than we would understand why the amygdales got into the diabase or know the exact meaning of regional metamorphosis.

Academic and Practical Geology.

Quite a lot of savants have at different times endeavoured to prove to their own satisfactions by means of numerous specious theories just how the Rand conglomerates were formed and how they derived their gold contents. But what is of infinitely more importance is to discover the source and origin of this detrital age and the belief of Mr. Struben that we have never yet worked our greatest and richest gold areas is a suggestion of such alluring possibilities that it would seem at least to merit investigation. It is only by a great stirring of public opinion that we can hope to force action in regard to the momentous matters with which this introductory article and our issue of this week are specially designed to deal.

The Rats and the Sinking Ship.

One can hope for little from the big mining houses. It is true that at Randfontein the Johannesburg Consolidated Investment Company is securing good results from the long neglected Horsham and Lindum series of reefs. This may help to stimulate interest in the overlying conglomerates and to break down the prejudice which exists against any formation which has not the hallmark of Main Reef series set upon it. But generally speaking the attitude of the large mining corporations towards the Witwatersrand seems to be one of indifference. The houses appear almost to be "fed up" with the problems and perplexities and anxieties of gold mining. They are branching out into coal mining and iron smelting, and one is forced to the conclusion that the rats, fattened by a surfeit of Main Reef for a third of a century, are deserting a sinking ship.

But most of us will find it exceedingly difficult to desert this once golden galleon of the Rand. We have staked our claims here and therefore we must try to redeem the Rand from the slough of despond into which it has fallen. We believe that there is still a great deal to be discovered or re-opened and profitably worked in this great golden tract. If we succeed in this it will be to the immense advantage of the country at large. And if not, well, we cannot help thinking that the sun of prosperity has set upon Johannesburg with its 150,000 inhabitants, and that unless something economically revolutionary occurs in the next year or two there will indeed, as Sir Lionel Phillips recently said, be grass growing in our very streets.

And, let it be remembered that the waves of poverty will not stop short at Johannesburg. Unless we obtain new mines to replace our old ones or by a large reduction in working costs and big increase in efficiency we render many millions of tons of low-grade ore profitable to work the revenue of the Government will be enormously reduced and every citizen of the Union will be directly and seriously affected.

The Messina and the S.A.R.

TERMS OF THE NEW AGREEMENT.

Last week we dealt with the new agreement between the Messina Company and the S.A.R., and we are now able to give the following official summary of the terms:—

(1) The former agreement is cancelled, and the new one substituted therefor, with the proviso, however, that should the Company at any time during the twelve months ending on the 30th June, 1922, cease to carry on its mining operations to the satisfaction of the Government Mining Engineer for a period of one month after he has given the Company one month's written notice setting out the matter or matters with which he is dissatisfied, or should proceedings be taken for liquidation of the Company, or should the Company not comply with the provisions of the new agreement, the Administration shall be entitled by written notice to the Company to terminate this agreement forthwith, and in that case the benefits conferred on the Company by the new agreement shall cease, and the provisions of the original agreement shall once more become operative, unaffected by the later agreement.

(2) From the 1st day of July, 1921, the Company shall become liable for the payment to the Administration annually of a sum equivalent to 7½ per cent. of the net profit earned by the Company in each of the years terminating on the 30th of June.

(3) The first payment is to be made at the head office of the Administration at Johannesburg, on the 31st December, 1922, and thereafter without interruption for a period of 15 years calculated from the 1st July, 1921.

(4) The amount of the said payment of 7½ per cent. shall be determined in the same manner and on the same basis as the 10 per cent. profits tax payable to the Union Government is at present determined.

(5) From the 1st July, 1921, and for a continuous period of 12 months thereafter, the Company shall continue to work the mines which are their property in the district of Messina, to the satisfaction of the Government Mining Engineer.

(6) The Administration undertakes to apply to Parliament during the present session for ratification of the new agreement, but failing such ratification the original agreement shall remain in force. In the meantime the new agreement ranks as provisional only.

(7) During the said period of 15 years the Company is not allowed to increase its debentures, or to effect any further mortgage of its fixed property, without having first obtained the written consent of the Administration to do so.

A Tati Concessions Settlement Scheme.

In connection with the Tati Concessions, Ltd., it is of interest to chronicle that the chairman of the company, Mr. A. Dodds Fairbairn, and the secretary, Mr. T. P. Patterson, have been on a visit to the property of the company, and have been pleased to note the progress being made at the Francistown district. Mr. D. Francis, the pioneer of the Concessions, died last year in London, but two of his sons are now resident in the district. The directors of the company have framed a settlement scheme under which young men of good character will be financially assisted to acquire and work small farms in the Concessions. The land is eminently suitable for cattle, and is quite one of the most promising pastoral districts in Southern Rhodesia. Mr. Fairbairn and Mr. Patterson sail from Durban by the "Kenilworth" on July 1.

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Early Days on the Rand.

ORE BODIES WHICH GAVE GOOD RESULTS BEFORE THE MAIN REEF SERIES WAS DISCOVERED—RECOLLECTIONS OF THE PIONEERS—THE CONFIDENCE REEF AND THE STRUBENS—ACTIVITIES OF MESSRS. NOURSE AND BANTJES—A PLEA FOR REVIVAL OF INTEREST IN THE REJECTED FORMATIONS.

In the earliest days of the Rand the Main Reef series was unknown, but a considerable amount of work was carried out on the ore bodies, both underlying and overlying the Main Reef horizon, and despite great transport difficulties, primitive methods, slender capital resources, and many other hindrances, good results were secured in numerous localities.

Later, discovery of the Main Reef beds caused all attention to be focussed on the Bankets, which in the past third of a century have been worked over a sixty miles stretch of country and have produced the great bulk of the world's output.

But it is an indisputable fact that the Main Reef series has passed the zenith of its prosperity, and in the interest of Johannesburg, the Reef, and the country at large it is essential that the merits of the long neglected auriferous conglomerates and quartz veins of the Rand should be examined in the light of present-day technical knowledge.

The following interesting article, compiled from reliable data supplied by Pioneers, tells of what was done on these ore bodies in the days before the Main Reef beds were discovered.

It is probable that gold was known to exist in parts of the Witwatersrand district at a very early period. Some years ago, the late Mr. Percy G. Shepherd, of the North Rand Gold Mines, stated that about the end of 1898 he came across an ancient working whilst following up the extension of the Rietfontein formation on the North Rand Company's properties. And shortly after the Boer War, he discovered further ancient workings on the northern side of the range containing the lowest beds of the Witwatersrand formations on the farms Wilgespruit, Roodekrans, and Honingklip. He found the hillsides honeycombed with these workings, extending over a distance of eight miles. They are circular in shape, and the large trees that are growing in many of them, and the fallen debris, testify that they are of great age.

Mr. S. P. E. Trichardt, formerly Commandant of the Transvaal Staats Artillery, has testified to a family tradition to the effect that about the year 1834 a certain Carl Kruger came to the Transvaal on a hunting expedition, and accidentally discovered gold on the Witwatersrand formation, and took samples to Cape Town. In 1836, S. P. Erasmus, with three of his sons and others, accompanied one Kruger from Cape Town to spy out the land and to shoot elephants for ivory. Whilst on this trip they were attacked by the Matabele of Umsiligaas (Moselikatse), the father of Lobengula, near where the town of Potchefstroom now stands. In this fight, Kruger and all the other members of the party, except Erasmus and one of his sons, who managed to escape, were killed. After this disaster and Kruger's death, nothing more was heard of gold on the Witwatersrand for many years. This hunting expedition of 1836 is referred to and substantiated by Thiel in his "History of South Africa."

A Close Preserve.

The Boer voortrekkers, because of their love of isolation, and from fear lest the attention of the British should be directed to their new country, were not only much averse to, but actually passed laws against prospecting, and prohibited the publication of any information as to the mineral wealth the country might contain.

Reference is made by Mr. E. P. Mathers in "Golden South Africa" to an article appearing in the "Friend" of the Free State, which states that as far back as 1854 a Boer worked on some ground resembling the soil of the Australian diggings, and succeeded in finding gold. Mr. F Struben was told by the Boers in after years that their first attempt to find gold was made where the old Pretoria Road crosses the Yokskei River, which is a small stream rising north of the present site of Johannesburg, and flowing into the Crocodile River. Although the Boer prospectors referred to seem later to have moved to the Witwatersrand, they apparently did not find much gold, seeing that no further developments ensued.

Baines, in his "Gold Regions of South-East Africa," states that in 1860, Mr. Saimders, of Rockdale, was prospecting on the Witwatersrand.

During the first British Occupation (1878-1881) of this country, an Australian mining engineer named Armfield, under instructions from the Government, prospected the quartz lodes on the farm Weltevreden, near Paardekraal, belonging to Cornelius Smit, but he does not seem to have met with much success.

Before this, of course, the rich alluvial fields of Pilgrims' Rest were discovered and worked, mainly by Australian diggers, so that a mining community already existed in the Transvaal. The Kantoor and De Kaap Goldfields were discovered in the early eighties, and the rush to the latter place was at its height when the Rand first began to attract general attention.

Early Operations on the Rand.

An option over the farm Kromdraai was held by a Potchefstroom Syndicate in 1882, in which Messrs. H. G. Van der Hoven, Fanie Minnaar, C. M. Douthwaite, and J. G. Bantjes were largely interested. Mr. J. G. Bantjes says prospecting work on this ground was conducted by him personally to the latter end of 1883. Later, Mr. Henry Nourse, who was accompanied by Mrs. Nourse, and had been prospecting from early 1884 on Albert's farm to the north of Maraisburg, took up the work on Kromdraai, which had been abandoned by the Potchefstroom Syndicate. In conjunction with Messrs. R. R. Hollins and W. K. Dow, he floated a company and put up a five stamp mill, subsequently increased to ten stamps, but owing to the patchy nature of the ground the venture was unremunerative. Alluvial ground was found, and worked by J. Lismore and others at Blaaubank about 1883.

Prior to the prospecting of the Kromdraai by the Potchefstroom Syndicate, a Mr. Hammerslag worked on the quartz veins underlying the dolomite near the Crocodile River on the Farm Tweefontein. He here put up a small battery worked by water power, which was the first mill erected near the Witwatersrand District.

The Struben Brothers played a prominent part in the early history of the Witwatersrand District. They had previous to this gained considerable experience in prospecting and working on most of the then known goldfields of South Africa. Mr. Fred. P. T. Struben's attention was first drawn to the Witwatersrand by the formation he saw there in December, 1883. He had been invited by his friend Mr. L. Geldenhuis, sen., to come and have a look at this part of the country, and on his arrival he rode for a couple

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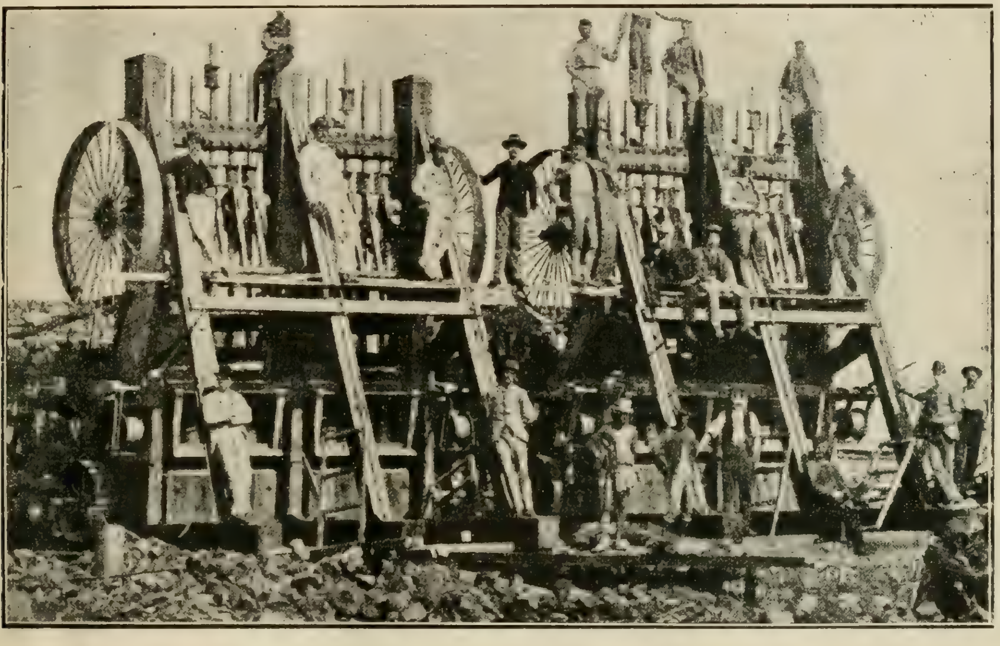
of days in and about the range, accompanied and piloted by Mr. Geldenhuis. So optimistic did the results of his inspection make him that he and his brother bought two farms, Sterkfontein and Zwaart Krantz, and in January, 1884, Mr. Fred. Struben commenced prospecting on them.

The Confidence Reef.

The second day after starting he discovered a quartz vein carrying gold, but although he vigorously prospected these two farms for seven months longer, he found nothing during that time of a payable nature. On the 18th September, however, he was rewarded by striking a rich vein on the farm Wilgespruit. He named the reef the "Confidence Reef," as signifying his faith in the gold-bearing possibilities of these fields. He at once notified his brother in Pretoria of his discovery, and they purchased a portion of the farm, decided to import a five stamp battery, and give the reef a good trial. Owing to difficulties of transport and other delays, this small mill was only erected in December, 1885.

A man named Arnold is reported as having first discovered gold on the farm Wilgespruit, but there is no reliable information to substantiate this, and Mr Fred. Struben has stated that Arnold was merely engaged by him to do some shaft-sinking on the farm after he had discovered the "Confidence Reef," and started mining operations. For various reasons, the Struben Brothers at first kept the discovery of the "Confidence Reef" secret, but in July, 1885, they made a public exhibition of some specimens before the Volksraad and Executive Council in Pretoria. As a result of Mr. Fred. Struben's find, Mr. D. Geldenhuis prospected the western half of Wilgespruit, and, finding the continuation of the "Confidence Reef" upon it, he and several of his friends formed a syndicate, and were so encouraged by the outlook on opening up the reef, that they erected a five stamp mill during 1886. Mr. D. Geldenhuis and his brother also opened a quartz vein at the base of the range on the north side of the farm Braamfontein, from which place they had some fifty tons of quartz crushed, yielding close upon an ounce to the ton. However, on the discovery of the Main Reef, attention was withdrawn from the North Rand, and further operations there suspended



A 20-Stamp Battery on the Rand in the early days. A few equipments like this, whatever reef they are located on, would, if satisfactory values were secured brighten the gloom of our present outlook.

First Work on the Banket Beds.

Mr. H. G. Van der Hoven, who lived at Potchefstroom in 1881, has stated that in that year, during a trip to this part of the country, whilst outspanned near Rietfontein, he came across some conglomerates, which he considered a singular formation and possibly diamondiferous.

According to Mr. Fred. Struben's statement, he came across some loose banket pebbles and a few pebbles cemented together in April, 1884, on Groot Paardekraal. This made him confident that there were gravel beds or drifts in the district, and a few days later, after further search, he discovered two well-defined banket beds or reefs on the same farm, but, finding no gold in them, he gave them no further attention, as he was too busily engaged with other work at the time. In March, 1885, however, he again turned his attention to the banket reefs, and this time was more successful. Finding several showing gold, he opened up one on the boundary of the farm Honingklip to the depth of ten feet, the width of the reef being about three feet, and panning about five dwts. per ton.

Mr. Struben emphasises the fact that this was the first work done on the banket formation. He wrote to his brother at the time informing him of his discovery of a new gold-bearing formation, and stated that if he could have the luck of finding one of the beds payable, there would be room and work for hundreds of mills and thousands of miners. Messrs. D. and L Geldenhuis (sons of L. Geldenhuis, sen., previously referred to) remember his speaking to them in similar terms at that time.

Messrs. J. G. Bantjes and C. M. Douthwaite secured from the owners an option over the north-western portion of Roodepoort, and Mr. Hendrik Bantjes commenced prospecting there about November, 1885. After some months of fruitless endeavours to find the continuation of the "Confidence Reef," he was about to depart, when Mr. Fred. Struben, realising that if he went away unsuccessful, as others had done, it would adversely influence investment in these fields, showed him some of the conglomerates, and advised him to work on them. He says Mr. Bantjes expressed great surprise, and would scarcely believe that they contained gold until some had been panned for him. Mr. Struben told him where he would find one of the banket beds on the extreme northern edge of the farm Roodepoort, where he had previously located it. Upon this, Mr. Bantjes decided to give the place another trial.

The First Crushings.

He commenced to open up one of the beds mentioned, and extracted about twenty tons of ore, which was crushed at the Struben Brothers' mill in January, 1886. These were the first conglomerates milled on the Rand. The results were practically nil, and the disappointment must have been great. Those were trying times for these early pioneers, hard work and many disappointments. In spite of this disheartening result, Mr. Fred. Struben's faith in the possibilities of the district did not fail, and he continued his endeavours, resulting in March, 1886, in his striking on Vogelstruisfontein what is now known as the Bird Reef. He milled about fifty tons from here, yielding about 6 dwts. to the ton. Mr. Bantjes had then also shifted his operations to this reef. It will thus be seen that prior to the discovery of the Main Reef, these gentlemen had carried on operations all around it.

Mr. Fred. Struben has stated that it was shortly after the crushing of the Bird Reef ore that a former employee named Walker went to join a friend who at that time was building a cottage for the widow Oosthuizen, then owner of a portion of the farm Langlaagte. It seems that whilst quarrying the stone for the erection of this building, from the sandstone outcrop they came across a vein of banket, which was panned by them, from experience gained when with the Strubens. This subsequently proved to be what is now known as the Main Reef Leader.

Walker immediately informed Mr. Fred. Struben of the discovery, whereupon he visited the spot, and was thus able to locate the Main Reef series on the western portion of the farm Vogelstruisfontein. Here Mr. Fred. Struben sank a shaft to a depth of 40 feet, which was the first shaft ever put down on the Main Reef.

It will be seen that in the early days the Rand gained a fair reputation as a goldfield before the discovery of the Main Reef series. The Reefs which engaged the attention of these early pioneers in days gone by are certainly worthy of attention at the present time, when the greater portion of the Main Reef series has been worked out on the Central Rand, and Johannesburg is wondering what its 150,000 inhabitants will have to exist on in a few years' time.

ROLLING STOCK FOR THE S.A.R.

An article in *Modern Transport* describes the 3ft. 6in. gauge four-wheeled open drop-sided sheep wagons and covered cattle bogie wagons building by the Gloucester Railway Carriage and Wagon Co., Ltd., for the South African Railways. The sheep wagons are 25ft. long over buffers and 8ft. 4½in. wide over stanchion brackets, height from rail to top of side doors 6ft. 3in., tare weight about 7½ tons, and loading capacity 30,000 lbs. There are three side-falling doors, the side stanchions sliding under the frame to increase loading facilities. The underframe, of standard sections, has a central H section longitudinal, 8in. × 4in. × 18.01 lb. per ft. The channel section solebars and crossbars are 8in. × 3in. × 3-8in., pressed steel body brackets being riveted outside the solebars and connected at the outer ends by 3in. × 3in. × 2½in. Z steel. Johnson's radial buffing and drawgear is fitted. The cattle wagons are 43ft. over buffers, 9ft. 4½in. width overall, and stand 10ft. 10 13-16th in. from rail to top of roof boards, with a tare weight of .19 tons 1¾ cwts., they load 60,000 lbs. The solebars of the channel steel underframe are in one piece, and the central longitudinals and bogie centre crossbars are also each in one length. The frames are 9ft. 11in. long over headstocks and 4ft. 11¾in. between solebars, the bolsters being made up of two channels 6in. × 2½in. × ⅜in. × 4ft. 8in. long, filled between webs with teak. A 21in. Automatic Vacuum Brake Co.'s pattern cylinder is fitted, and the drawgear is the same as fitted to the sheep wagons.

TECHNICAL TRAINING.

The Board of Trade Journal gives prominence to a lengthy extract from a statement received from Professor McMilan, of the Capetown University, by the British Trade Commission to South Africa, who have recently been considering the question of attracting young South Africans to the British engineering and other technical colleges and training establishments of the United Kingdom, says our London correspondent. Professor McMillan calls attention to the success which attended the policy of the United States in attracting students from South Africa. He recognises that the British universities would have difficulty in accommodating more students from overseas, but argues that it would pay in the long run to attract overseas students, even if further accommodation had to be provided. It is felt strongly that the manufacturers of the United Kingdom should do everything in their power to attract the future leaders of Colonial industries to the British research laboratories.

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The North Rand.

IMPRESSIONS OF THE "MINING JOURNAL" EIGHTEEN YEARS AGO—HOW LE COMTE DE WARU AND MR. PERCY SHEPHERD ATTEMPTED TO EXPLOIT A NEW RAND—ARE THESE NEGLECTED ORE BODIES WORTHY OF MORE INVESTIGATION?

Eighteen years ago the Comte de Waru and the late Mr. Percy G. Shepherd and others were busily engaged in endeavours to establish another Witwatersrand on the line of the beds which underlie the Main Reef series. At numerous points they secured good results, but lack of sufficient capital and water difficulties at moderate depths prevented them from carrying on with their work. These properties have now been abandoned for a number of years, but in view of the present plight of the Main Reef mines it might well be worth while to reprospect this line of country, in which the Struben Brothers located their famous Confidence Reef many years ago.

The following brief article is reproduced from the "S.A. Mining and Engineering Journal" of May 2, 1903, and it will at least be interesting to note the opinions of a representative, gained from a visit to the properties shortly after the conclusion of the Boer War and at a time when most people were optimists and seemingly believed that the Main Reef series would last for ever.

The North Rand.

"On Tuesday last a party visited the property of the North Rand Gold Mines, and a very interesting day was spent. Wilgespruit was the first farm visited, and here the Company have very extensive holdings. One of the first impressions one gets on visiting this line of country is the striking contrast afforded between the character of the North Rand, wild and rugged, and that of the gently sloping, comparatively flat country overlying the Main Reef series. Wilgespruit somewhat reminds one of the North American mining camps, and these older and rugged beds seem typical of Protozic gold-bearing areas. Such a country affords a distinct advantage in possessing ideal milling and cyaniding sets; tailing wheels and elevators, which are necessarily in use on the Main Reef mines, would be rendered unnecessary on the North Rand, where gravitation is so largely in evidence. Water is abundant, and this is another important consideration. On Wilgespruit, where the North Rand "A" property is situated, four or five prospecting shafts and a number of pits and trenches have proved the formation to a small depth. In No. 1 shaft a 6 ft. ore-body has been noted, and the shaft is down about 115 ft. Drives have also been extended to test the country. At surface the shales are interbedded with the ore-body, and the formation is hard to follow, but the stratification becomes more defined as the formation is opened up in depth. The reef, which shows visible gold in places, appears to consist of a slightly ferruginous crystalline quartzite with jaspery enclosures and inbedded and interlacing shales at the surface. Samples were taken from the two extreme workings, about 170 yards apart, and showed a very good panning of perhaps 2 oz. to 3 oz. "prospect." The reef exhibits slight breaks in places, but the general conformability of the strata shows the reef to be very regular. Good values are obtained from the green quartzose shale footwall. A little to the north of these beds the Hospital Hill shales occur, and exhibit a great deal of contortion. North of this, the Du Preez series outcrops have been located, and it is assumed that the series continues throughout the range, which runs regularly along the strike of the North Rand "A" Reef.

On the Line of the Confidence Reef.

On Weltevreden, a part of the farm is held by the North Rand Gold Mines; the brothers Struben started quartz mining and milling were on the "Confidence" Reef in the early days. Perhaps the best policy for the company to adopt would be to continue and extend their present workings, put down a borehole at an inclination to strike the beds which dip at a high angle, and erect a small prospecting battery for treating a few hundred tons. Water in the kloof could be utilised, and afford the motive power for preliminary crushing operations. After inspecting the North Rand "A" ground, the party visited the "North Rand Promise" section. Here several shafts and trenches have proved the continuity of the North Reef of the Red Reef series for a considerable length of country—about two miles. This reef more resembles the Main Reef deposits than North Rand "A," and consists at the surface of coarse, gritty conglomerates. At the Promise shaft, which is down about 50 feet and is being enlarged, some samples of this banket were panned and yielded excellent results. The reef is highly inclined, dipping at an angle of about 75 degrees, and the shaft is about 8 feet by 7 feet in size at the bottom. The ore body varies in size at different depths, but the formation is very settled, and seems by no means typical of a disturbed area. On this line of country Mr. A. F. Crosse took an independent sample before the war, and obtained a result of 2 ozs. 2 dwts. over 2 feet. Unhappily, the party had insufficient time to visit the Witpoortje Kloof property, where a considerable amount of work has been done on the Red Reef series. Here the stratification may be very clearly seen and studied. A large waterfall is a decided benefit to the property. The North Rand "Coronation" Reef is another ore-bearing portion of the proposition. We understand that a scheme is on foot to sink several boreholes on the properties, and these should give interesting results. Several prominent mining men have recently visited this line of country, and although very much cannot as yet be said of the North Rand on account of insufficient development, it is certainly an area possessing great possibilities.

The North Rand's Reputation.

Assay results made by the Standard Bank and independent assays show good results along this line of country, and although reefs north of the Main Reef series have been condemned as being patchy, pannings along this horizon have shown remarkable consistency. Quite recently the South Reef of the Red Reef series as worked on Witpoortje Kloof has been located south of the North Rand Promise or Northern Red Reef. Assays have varied from 6 ozs. downwards, and the conglomerate largely resembles that of the Main Reef series.

So far the North Rand Company has not been able to concentrate its energies on any particular subsidiary, as a large amount of business has been entailed in taking up additional tracts of land, but the erection of a small battery is imminent, and important developments may be awaited from this district, and on Honingklip and Waterval—other holdings of the Company."

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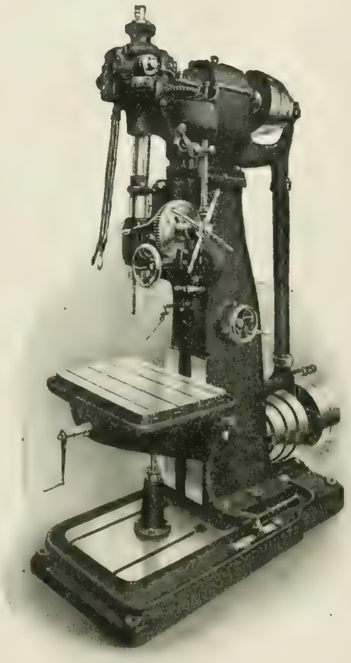

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The Auriferous Ages of South Africa.

MR. SCOTT ALEXANDER REITERATES HIS VIEWS—THE UNRECOGNISED GOLD FIELDS OF THE UNION.

Many readers of this journal must have read with interest the various letters of Mr. Scott Alexander, which have from time to time been published over a lengthy period of years. "The Rand Stratigraphist," as Mr. Alexander chooses to call himself, has persistently preached the doctrine that the Main Reef series represents only a minute fraction of the enormous auriferous tracts of the sub-continent. Many people will, perhaps, consider that Mr. Alexander's optimism is too boundless and that his assertions are too sweeping. But in view of the parlous plight of the Central Rand and the unpromising outlook for Johannesburg, would it not at least be worth while to put some of Mr. Alexander's theories to a practical test?

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—The economic geology of South Africa has been my hobby for the last thirty-five years, leaving the fossils, igneous rocks, and things of that sort to Doctors of Geology to discuss, and theorise about. I had enough of them in my schooldays in Europe, more especially at Bonn, in 1864, where doubtless the ex-Kaiser, later on, also learnt something of rocks from the same Professor, but not sufficient evidently to keep him off the rocks, still later on.

Too much talk of igneous rocks, dykes, flows, faults, etc., with which the Geological Survey gentlemen pad their reports, or memoirs as they term them, is faulty geology—mere excuses, in my opinion, to hide their lack of practical knowledge of the economic side of the business, for which, I presume, they were voted high salaries, in the Milner days, to keep the public informed, and to proclaim the same to the world generally

As an example of their failure so to do, we have only to take Dr. Mellor's Memoir of the Rand, when he was with the Geological Survey, and what do we find? No payable reefs painted north of south of—that is underlying or overlying—Main Reef series, all igneous rocks, etc! And when he got out of his depth on the Far East Rand, he condensed the lot into one solitary reef, which he dubbed "Main Reef Leader with a shale foot-wall." As much as to say, here is a good red herring for you, my boys—follow it if you can! Hence all this pother of late between the enterprising Mr Bleloch and our grasping, unsympathetic Mines Department, who apparently would annihilate him if they could, for daring to try and prove that his ground in the Heidelberg district, for which he has to pay them thousands of pounds per annum, contains not only "the Mellor Reef," but half-a-dozen other payable ones, which to me are old friends of years, although my nomenclature, and stratigraphy, may not quite fit in with his every time, any more than it does with theirs at any time.

I am a great sticker for the Black Reef series, which belongs to another geological age altogether, but is so jumbled up (this for the lay-man) with our Witwatersrand age that the Geological Survey is incapable of unravelling them, hence the complex stratigraphy they give us whenever they attempt geologising in any of our principal banket areas, such as the Rand, Heidelberg, Free State, Klerksdorp, etc.

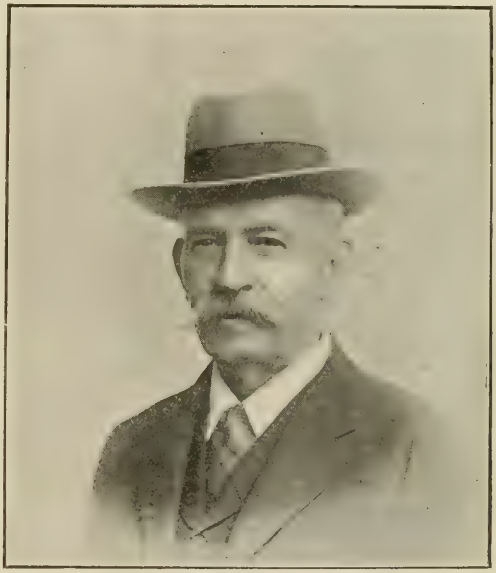
"The Truth and Nothing but the Truth."

My object is, and always has been, to give the truth and nothing but the truth concerning the vast auriferous potentialities of this country, with which I am intimately acquainted, and your pages for many years past have contained nearly all that I have found out about it, for there are no books worth consulting to guide one, only Nature's book, which does not lie, and its pages are plainly writ.

Yet, Sir, since your Journal is now being so widely distributed over the Empire and the U.S.A., where I have many friends and relations, allow me to reiterate for present-day readers a few of the broad outstanding facts concerning it.

(1) The granites, norites, and other ites, are the underlying rocks with us, as elsewhere in the world.

(2) Out of these was formed the "Schistose Age" (also, which all the world has) consisting of talcose slates, micaceous sandstones, shales and sandstones, etc., such as Dana, Geikie, and all other standard works on Northern Hemisphere geology ascribe to it. These again were interlarded with bedded quartz veins, during the process of deposition, and, from observation, I gather, as soon as Nature had completed a horizontal thickness of five miles, she destroyed it. In other words, split, cracked, fractured, and upturned it in all directions, at all dips and angles, by pushing up plastic granites, basalt, diorite, diabase, etc., to fill the cracks and gashes, so to speak. These, of course, are what the geologist terms dykes, flows, etc., and so forth. This little display of Nature's force, energy, or whatever we like to think of it, was, in my opinion, done suddenly, in one act—none of your shrinkage theory as books tell you. At the same time hot waters carrying gold and other minerals in solution, from out her subterrranean laboratory, filled the minor cracks, making what geologists, and miners too, term fissure veins, gash veins, etc. And so ended this, the first of Nature's cataclysms.



Mr. Scott Alexander.

(3) Then came a time of quiescence—with us at any rate —when the debris of all this conglomeration formed another five-mile-thick age on the top of it all. And when its time for destruction was due, the same process was repeated—and up that went!

The Lydenburg Age.

This age we call, or rather I call, for geologists come lately have no special name for it, "the Lydenburg age," as in that district are to be found some of the best sections.

The composition of this age is as follows, in ascending order:—

Quartzites and shales, auriferous conglomerates ("Denny Dalton," for instance), auriferous sandstones, magnesian dolomites, often 1,000 feet thick, containing horizontal quartz reefs; then shales, quartzites, shales, quartzites, shales, quartzites—finish! The dolomites are not only auriferous, but contain galena, venadinite, copper, pyrites, etc. The shales also are blessed with lenticular quartz veins (very rich in some places), asbestos, and other minerals, including iron, which is too widely distributed in South Africa to make special note of. The same may be said of diamonds, so widely distributed, although they take a little finding.

(4) Further quiescence! whilst the debris of all the former went to make up our Witwatersrand banket, or quartz pebble age. When it became five years old—I mean five miles thick—up she went in the same way, with centres of cosmic action all over the country—for that was a big affair!

On the Rand there is a twenty-five mile fragment, a perfect section, standing vertical at out-crop chiefly, in fact, overtilted in places. In others separate fragments at varying angles, and as far away as 250 miles from Johannesburg, S.W., lying almost flat.

The sequence of this age, in ascending order, is conglomerates (note that), quartzites, shales, quarztites, shales, quartzites, shales, and so on up to the underlying shales of Main Reef series—say, 2½ miles from the foundation (which happens to be an immense area of granite, and granulites, north of Johannesburg, but not necessarily everywhere else).

Then commence quartzites up to what we term the bankets of the Elsburg series, which is perfectly conformable.

From Main Reef series, in ascending order, as above, there are roughly some three or four hundred banket beds, or reefs, divided for convenience into series by the early prospectors of the Rand, and the old names have stuck to them ever since. All these banket beds are not payable, as can be imagined, but to my knowledge, including Main Reef series, a couple of dozen are, or will be when we can come down to 4½ dwts. over a stoping width. And why not?

For a mile and a half underlying Main Reef series (tight section), in the shale and quartzite half of the age, as aforesaid, our richest series of banket beds lie, such as the Blue Sky or Molyneux, Van Ryn, Du Preez, Government, and Alexandra Estate beddings (which cover a multitude of narrow but rich reefs). Here we have another two dozen, or more, on the same basis as above, in which are included a dozen up-to-date payable ones, very rich, beating anything Main Reef series can produce, and this formation can be traced for miles and miles.

The Fetish of Main Reef.

To be plain, our Rand capitalists started on Main Reef series, have made all the money they require out of it, and dub any new extension "Main Reef," or at least their engineers and geologists do so for them, and haven't time for the underlying or overlying reefs. In fact, *embarras de richesse* appears to be the complaint from which they are suffering. Many of us no doubt wish we were suffering with half of the same complaint, yet it should be evident from what I have endeavoured to point out, there is lots of room for others to come here and do likewise, if they will only bring open minds as well as capital. Please excuse my digression!

We will now return to the geological side, which, to tell the truth, I am tiring of, having written it so often for local consumption.

The debris of this unique Witwatersrand age, after its shattering, was made up.

(5) The Black Reef age—my favourite! This auriferous age covered most of the former ages within its reach, and a good reach it had, as it covers thousands of square miles. From its foundation upwards we have shales, quartzites, shales, quartzites, and pebble beds—a hundred at least, which are termed "Black Reef series," vide "Randfontein" vertical, and the Far East Rand on "Klipfontein," for instance, at a low angle, and other areas too numerous to mention.

Randfontein Gold Mining Estates is working five or six of these reefs, or pebble beds. Their West Reef, for the sake of nomenclature, is the Black Reef, the self same, dare I say, being the mainstay of the Far East Rand—but this is another story.

Above these beds, where perfect sections exist, come dolomites of great thickness, interstratified with calcedonic quartz, then shales, quartzites, shales, quarzites, shales, quartzites—nonauriferous though in one of the quartzite layers is to be found Dr. Hatch's "boulder bed," which doubtless has caused many a sleepless night to the worthy doctors who have come after him, as it turns up in the most unexpected places, and is confusing in the extreme to the new chum.

However, like all Nature's five-mile-thick ages, this poor thing had to meet its doom, as all others before it, and now we find it scattered all over the country over the other ages, under the coal measures, and so on. Yet it has left such long stretches of unmistakable out-crops, tombstones as it were, that to the experienced prospector, or observant geologist, they should be recognised at once, and not confused with other banket beds; nor its dolomites with the Lydenburg dolomites, which they do not resemble in any one particular. To wit! For a good section, including the "boulder bed," see from Vereeniging to the Klip River, the latter so often quoted by geologists for amygdaloidal diabase, "its foot wall," and no other. So say I!

(6) Now we come to our "Coal Measure age," with all its different horizons, which Cape Colony geologists feast on in the way of fossils in the lower layers, also a few on the top.

Icing to a Wedding Cake.

This age, my readers, is like icing to South Africa's enormous wedding cake. For it covers all other ages, and it is only where a bit of the icing has been worn off here and there that we can get a glimpse of the mix-up beneath, as on the Rand, Heidelberg, Free State, Klerksdorp, etc., above mentioned. So probe by drill where you will below this covering, and there must you find one or other of the past auriferous ages. But, thank goodness, we are not reduced to those extremes yet, as there is plenty denuded country, and to spare, for generations to mine from surface, with moderate capital behind the pick, as in the early days before these deep levels *ad absurdum* came along to make, and burst, some of the community.

Although I rather fancy myself as an expert on our "Coal age," I will not encroach on this in my present letter, knowing that your worthy and capable Special Commissioner is producing an issue of his own on the same subject.

Suffice to say, that this ubiquitous age has reached its zenith and is also five miles thick. Why Nature is delaying its destruction is not for an atom like myself to question. "Sufficient to the day ——!"—I am, etc.,

SCOTT ALEXANDER,
"Rand Stratigraphist."

Johannesburg, June 13th, 1921

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Mr. Wm. Struben on Early Reef Discoveries.

AN INTERESTING CHAT WITH A PIONEER.

Last week-end we were favoured with a call from Mr. William Struben, who is now farming down Volksrust way, but still takes a lively interest in all matters concerning the Rand.

The names of the Struben brothers will always be associated with the earliest finds of gold on the Witwatersrand, and in view of the imperative necessity that now exists for the opening up of new gold mines to replace our exhausted ventures it will be of particular interest to hear what Mr. Struben says about the underlying reefs of the Witwatersrand (and the overlying reefs as well), and of the results secured on them in the years long gone by

Mr. William Struben has told us that he worked alluvial in the Golden Valley on Jennings' Farm, Blaaubank, about 1874 or 1875. "Then in '84," said Mr. Struben, "my brother, Mr. Fred. Struben, came up here, and he found gold on the Far West Rand, on Jacobie's Farm, 'Sterkfontein,' in white quartz, after which we traced the gold on to a farm called 'Honingsklip,' adjoining 'Paardeplaats' on the North, where it was fairly rich We then worked along, and found gold on 'Paardeplaats,' and that is where the Confidence Reef was found.

"Then we found gold on 'Wilgespruit'; this was very rich. Mr. Harry Struben took this gold to the Volksraad. The Government of the country were bankrupt and were just on the point of making another big issue of notes. My brother told the Volksraad that he had discovered gold, and that there would be no necessity for a further large note issue.

"Shortly after that, the Geldenhuys started prospecting, and about this time the conglomerates were found. Ever since then these conglomerates have absorbed all attention and capital, because although very heavy gold was found north of the Reef series that are worked to-day large permanent stretches were not located. Close to the dynamite factory on Modderfontein in 1894-1895, boulders showing gold were found. The late Mr. J. S. Curtis was manager of the Du Preez Mine at the time, and these boulders were taken to the Du Preez Mill and were crushed there. They showed visible gold, and gave rich returns."

Mr. Struben stated that the heaviest gold has always been found to the North. The gold found on the Du Preez Reef was nuggetty and showed marked crystallisation. "The heaviest and richest gold was found on the surface."

With regard to the overlying reefs, Mr. Struben stated that he crushed 2,000 tons of the Kimberley series taken the farm "Vogelstruis," in the Old Roodepoort Central Deep Mill, and this yielded 4½ dwts. over the plates only without cyanide. This was about 1894-1895.

A Bonus on Gold Production.

AMERICAN SUGGESTIONS.

From the review issued by the National City Bank of New York, we learn that American mining men are watching with much interest the fate of the Bill introduced into Congress by Republic representative McFadden, providing for the payment of a onus for new gold production. It is felt that great mining activity would result throughout the gold mining industry if the Bill should become a law. The *Journal of Commerce* reports the result of an interview with Mr. John T. Burns, assistant secretary of the American Mining Congress, as follows:—

The "Gold Bonus Bill," as it is commonly called, was introduced in Congress by Representative Louis T. McFadden, of Pennsylvania, Chairman of the Banking and Currency Committee of the House, to prevent a further decline in the nation's gold production and the wastage caused by deterioration in mines that are closed on account of prohibitive costs. The gold production of the United States declined from 101,000,000 dollars in 1915 to 49,500,000 dollars in 1920, which indicates to what extent the mines are already closed down.

The gold used by the Arts and Sciences during the year 1919 amounted to 75,500,000 dollars more than was produced in that year, according to the report of the Director of the United States Mint.

Thousands of square miles of ground that would pay wages to the individual miner under normal conditions in the U.S.A. are at present idle, and will remain so until such time as they may be worked at a profit.

"The McFadden Act," said Mr. Burns yesterday, "provides for a bonus of practically 50 per cent. on gold brought to the Mint or Government Assay Offices, which is to be paid out of a fund derived from an excise tax of a like percentage on all gold used by manufacturing jewellers and consumers of gold for other uses than coinage."

Gold being worth a little over 20 dollars a fine ounce, the bonus of 50 per cent. would bring the value of the metal to approximately 30 dollars a fine ounce, and would result, it is believed, in a rush for the goldfields and a consequent increase in the output.

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The output for the month of May was 451 carats. Prospecting of the Nautilus field has been completed and the working of winning diamonds from this field will be commenced shortly.

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Mr. W. P. Taylor on the Plight of the Mining Industry.

THE COMMUNITY SHRINKING INTO FORCED LIQUIDATION—A RECOLLECTION OF MODDERFONTEIN—POLICY OF THE BIG HOUSES—THE GOLD OF THE NORTHERN REEF—HOW THE POSITION MAY BE SAVED.

Three months ago Mr. W. P. Taylor, who is well known as a leading Rand Pioneer and who has been intimately associated with mining and agriculture in this country for nearly half-a-century, favoured us with some valuable views on the Union's outlook and its immeasurable mineral wealth. We are glad to publish in this number a further interesting contribution from Mr. Taylor, in which a special effort is made to stir public opinion up to a full recognition of the present calamitous plight of our mines and to draw attention to possible ways and means of prolonging the life of the Rand.

Sir,—I am glad to see that my endeavour to place before the people of this Union the dangerous position that is being drifted into and the strange apathy of those that are mostly concerned in the matter is being brought forcibly to public notice. It can never be said that I am a pessimist, but we all learn our lessons from experience, and even if we do not benefit personally by our lessons, one can perhaps do good through them to others. Since I wrote some short time ago about the possibilities of payable gold reefs, underlying the Main Reef series, various reputed discoveries have been brought to my notice and the *Daily Mail* made the most sensible suggestion of having a Commission appointed to investigate the matter. I have had some fifty years of mining experience and I would like to place a few facts before you that may prove interesting. In the year 1874 my father and myself owned a very large part of the De Beers mine. Unfortunately, through having too much ground, we were constantly forced to work down dangerous parts, and that, together with disappointments in finds, caused us to sell and forfeit our claims; now, a great part of those claims that we held was considered about as payable as the present underlying strata to the north of the Main Reef, and when the mine developed it all had the same value.

The Case of the Modders.

I remember the present Modderfontein farm and all the vicissitudes that it had to undergo. At the time the shares were worth 4s. apiece there was not much to show for the money. A thin rich leader caused hope, and although the general result of banking upon hope in mining results in misery, in this instance it led those that had the pluck to hang on into great good fortune. I purchased part of the Modderfontein farm called The Restante for the late Hermann Eckstein, and its first results were extremely disappointing, in fact they did not know where to look for gold—and yet Modderfontein farm will return somewhere in the neighbourhood of some two hundred million pounds worth of gold before it is worked out. There are surface indications in the Far East Rand as good as anything that was first sunk on on Modderfontein and other properties that have turned out rich, and there are surface indications of narrow rich seams of conglomerate to the north of the Main Reef showing visible gold. If these occurrences received anything like the same attention that Modderfontein and kindred concerns have had shown, then might we not have many Modderfonteins? Had these recent discoveries been opened in the nineties I dare say vast sums would have been spent upon them, and as it is to-day, the large houses seem to be abandoning gold for coal, and there is talk about new industries that are to supplant gold mining.

Coal Mining Will Not Suffice.

Personally, I fail to see what is to take the great gold industry's place. Coal mining will not support the 150,000 people who directly and indirectly live on the gold industry, and it won't supply the same internal market for the farmer. If coal is to be mined and sent out of the country, its benefits to the population can be gauged by what its units do for the country to-day. When coal is used on a large scale with iron and steel and the industries can export, then all difficulties may vanish, but to-day there seems to be a desire to abandon our strongest area, and, therefore, I trust that, with the investigation that will soon be made, there will come as well a sensible reaction on the part of the Government, for my observations lead me to conclude that it is not only necessary to prove the existence of payable ore bodies, but that the welfare of gold mining and the welfare of the Union needs a recast of its mining laws. Instead of penalising men who give up their time and money to find a new Rand, give them a fitting bonus. The country is in need of a new goldfield. Give the man who produces it £100,000. It will return hundreds of millions and it would be a good investment for all concerned. Change the licensing laws and make work compulsory, and above all, instead of hanging every mining concern with red tape officialdom, let the mines have an equal voice with Government servants in framing all those laws and by-laws and rules that drive managers mad and delay, intercept, and waste time and money to oblige the arrogance of offi-

Mr. W. P. Taylor.

cialdom. With such a spirit and the assistance of labour, I have no doubt that the anticipations of Mr. Samuel Evans and Mr. Wessels and others will become realised, and the large bodies of low grade reefs, which are known to exist, will be worked, and, with such co-operation, it is not impossible that gold mining will be carried on here for centuries; but, as matters stand to-day, a baby can see the certain shrinkage that the industry is drifting into.

The Country is Good Enough.

It is not necessary to advertise the fact that money is already unobtainable for any purpose. The whole country is shrinking in forced liquidation, and this spirit magnifies and makes timid people fearsome, and all this I hold is unnecessary. The country is good enough and as full of possibilities as it ever was, but are we doing our best to prove it and to make it produce? Of course, if the natural resources of this great country are to be manipulated to pass through only one or two hands, then, of course, it would be useless for anyone to "get hot" over the matter, and useless for the individual to think that he has any rights in these resources; butif the farmers, the merchants, the workmen and others who want internal markets and work that they can rely upon, don't want to see a shrinkage which will bring about a condition such as you see at at Kimberley, Jagersfontein and the Premier Diamond Mine to-day, then let them study their own interests and let their representatives in Parliament give full attention to the necessity for opening up minerals, and let them see that the men who find work get fair play.

A New Coal Producer.

THE "BLACK DIAMOND" COLLIERY—PLANT TO DEAL WITH 25,000 TONS PER MONTH.

The latest addition to the ranks of Transvaal coal producers is known as the "Black Diamond" Colliery, which is situated in the Ermelo district and of which Mr. R. H. Bertram is Chairman. The Company was registered on 13th January, 1920. Actual work was commenced on the Siding on the 16th December, 1919, and the first sod on the adit was cut on the 10th September, 1920. The Company was originally formed to work the mine on a very small scale, with only a minimum outlay on plant, and to reconstruct and add to the plant as returns from coal came in, in other words, to adopt the same lines as pursued by the Union Colliery. At the first meeting of the Directors however, it was decided to start operations on much more ambitious lines, and Mr. Holford was asked to prepare plans for a plant to deal with an output of up to 25,000 tons per month. These having been drawn up and approved of, Mr Holford advised the Company to concentrate all its energies on the building of the railway siding of 1½ miles, and the first engine passed over the line on the 7th October, 1920. In the meantime some 60 morgen of ground was purchased from the African Farms, being portion of the farm "Roodebloom." This valuable purchase facilitated adit working considerably. The first coal was cut early in November on the top seam of 9 feet, and during that month 473 tons were disposed of at an average price of 8s. 2d. per ton; in December 860 tons, at 9s. 11d. per ton; in January 1,087 tons, at 8s. per ton; in February 1,308 tons, at 7s. 11d. per ton; in March 1,815 tons at 7s. 1d. per ton; all of which was hauled by oxen. In April the steam plant, with a winch, was installed and 1,920 tons were mined and sold at 7s. 3d. per ton. In the meantime work was proceeding through 9 feet of sandstone, so as to reach the bottom seam, and during the latter part of the above month coal was being extracted from the bottom seam. Steady progress was in the meantime being made with the erection of the plant, the coal in the meantime being screened over a 5-8th Grizzly, which retarded the output considerably. During May it was decided to abandon the top seam and devote all energies to the output of coal from the bottom seam, as it was considered policy to put out the best coal and thus secure a good name for the product in the market. The wisdom of this policy, the directors feel, is already being evidenced by the satisfaction expressed by customers. The first and most important plant was opened formally, on the 28th May last, when Mrs. Bertram started the engine and tippler going. The remainder of the plant to deal with the finer coal, such as nuts, peas and duff, will be proceeded with as soon as the financial position of the Company warrants it, which should be at a very early date.

THE BLACK DIAMOND COAL MINE.

Swaziland Tin.

The following are the results of the operations of this company for the month of May, 1921: Concentrate recovered, 25 tons; estimated working profit (taking tin at £160 per ton), £5; add adjustments in respect of previous shipments, £1,303, total profit for the month, £1,308.

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FORMATION OF A COMPANY.

Some little time back, a beautiful sample of Serpentineized Dolomite was brought into Johannesburg, which had been discovered whilst prospecting for coal. A well-known gentleman, Colonel W. F. Barker, C.M.G., D.S.O., went into the matter, and spent considerable time and money in prospecting and developing the property. The result has been so satisfactory that it has been decided to go into the matter thoroughly. The gentlemen who spent their private money asked the Government's Geological Surveyor, Mr. Hall, to look over the property, and he was so much struck with the formation and the various colours, and its nearness to the railway (only 3½ miles away), that he was very favourably impressed with its commercial possibilities. This formation is dipping with the surroundng country rocks at an angle of about 25 degrees, and sufficient outcrop has been exposed for fully ¾ of a mile, which will yield sufficient material for half-a-century without working further on the extension. The colours vary from black to deep olive green, light green, grey, and they are beautifully "figured." There is, too, a very fine brown colour, also splendidly figured. Shortly a lot of slabs, etc., will be sawn and polished and shown to the public. Sizes of any description can be dealt with. But the great feature of this proposition is that it will create a new industry. The material can be used for any class of work that Caraira marble can be used for, such as dados, panelling, tiles, pillars, etc. A company will be formed for £20,000, and the working capital has already been guaranteed. Everything points to the concern being a success in the immediate future, as operations will be started at once. Machinery for sawing and polishing will be erected at the earliest possible moment, and this can be obtained locally.

A company is being formed styled Barker's African Marble Company, Ltd., to acquire rights over these marble areas and to work them. The nominal capital is £20,000, divided into 20,000 shares of £1 each, appropriated as follows:—Vendors, £1,000 cash and 10,000 shares; working capital, £6,000; reserve, £3,000; total, £20,000. The directors are—Colonel W. F. Barker, C.M.G., D.S.O. (managing director); Lieut.-Colonel Vicomte Rene de Sarigny, O.B.E.; and Mr. Frank Ernest Davis.

An analysis of the marble made by Messrs Littlejohn and Whitby, gave the following result:—Silica and insoluble, 27 per cent.; oxide of iron, 0.97 per cent.; alumina, 1.17 per cent.; oxide of calcium, 26 per cent.; oxide of magnesium, 17 per cent.; carbonic acid, 20 per cent.; sulphur, nil; water of hydration and loss, 8 per cent, and principally hydrated silicate of magnesia with 45-46 per cent. carbonade of lime.

We may add that we have seen specimens of this marble, which have been brought to Johannesburg. These are of beautiful colour, and would make magnificent decorative building stone, which should be eminently suitable for tablets, panels, memorials, etc.

ELECTRICITY IN COAL MINES.

During the three decades, 1890-1920 (says th "Mining and Scientific Press"), electricity as applied to coal mining made rapid progress, until to-day there remains hardly a task or an opeation connected with coal mining that is not directly or indirectly concerned with the use of electricity. From the time the miner takes his electric cap-lamp in the morning until he has completed his task at night, he is continually using electricity or electrical equipmnet. The electric signal tells the hoisting engineer when to start and to stop the hoisting engine. The lights at the several levels and at dangerous crossings throughout the mine are usually electric. The telephone is a part of the equipment necessary underground. Electric shot-firing and electric shot-firing systems are becoming widely used. Electric pumps handle much of the water in the mines. The haulage of coal is done largely by electric-trolley and by storage-battery locomotives and electrically operated hoists. Each year some new electrical device is introduced, says a recent publication of the Bureau of Mines. Electrical equipment for mines, in order to be safe and efficient, must be properly designed, carefully installed, inspected at regular intervals by competent men, and maintained in good working condition. In general, the best way to obtain satisfactory electrical equipment for mine service and to ensure its proper installation, inspection, and maintenance, is for each State to make and enforce fundamental rules and regulations relating to the use of electricity and electrical equipment in and about coal mines. The rapidity with which electrical equipment has entered into the many phases of coal mining has exceeded greatly the advance of regulations governing its use. Even the best electrical mining codes in force need modernising, and some States have even neglected to mention the use of electricity in their mining laws.

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EDITORIAL.

THE CHAMBER'S DILEMMA.

The Joint Executives of the Mining Trades Unions have recommended that the reduction of the wages of certain employees on the Reef by 3s. per shift, as proposed by the Chamber of Mines, should be resisted.

That such a recommendation would be made was more or less of a foregone conclusion. There is now talk of a meeting of the National Conference of Employers and Employees, in order that the wage question generally may be reviewed before any reductions take place. What the final result of the whole business will be remains to be seen. The price of gold appears to be still advancing, and this in the opinion of the men very largely invalidates the Chamber's argument for a reduction of pay as it was presented the other day by Mr. Buckle, whose case was largely based on the decline in the premium.

As we stated in our last issue, we do not think that the Chamber of Mines has made the best of its opportunities for securing a very much needed epoch of economy and efficiency on the Reef. The Heads of the Industry have not presented the best or most consistent of arguments, and their case for a wage reduction, although eminently sound in principle, has been ill-timed and badly framed.

Weeks ago, this Journal urged that the Industry should press forward with a campaign designed to secure better value for the money paid to Rand mine labour. We considered that such action should have been taken immediately, or very shortly, after the fiasco of the sporadic and half-hearted strikes, which were timed to synchronise with the elections.

The Unions were then quarrelling amongst themselves, and their members were demoralised. A skilful General would then have thrown in his cavalry, followed up his advantage, and gained a great and lasting Industrial Victory. There might have been resistance, but it would have been more easily overcome than it will be overcome to-day.

Labour's forces have had time to reorganise and consolidate their position. They are now pretty securely dug in behind the rising gold premium. Weeks ago, we pointed out that one result of the great strike in England would be an increase in the price of gold, and that this upward tendency, when later influenced by the incidence of the American harvest, would cause a sharp advance in the selling price of the product of the mines.

It is passing strange that the Sanhedrin of the Rand, with all its highly paid advisers, was not able to appreciate a perfectly simple and obvious deduction. It is even more strange that the Chamber did not press home the advantage it gained after the failure of the half-hearted February strikes, and, before the effect of the British coal debacle was felt on the gold market, and whilst the premium was falling, demand a very much needed improvement of service from the employees of the mines.

As it is, the Heads of the Industry lost two precious months in which much might have been achieved. It is true that when gold rose there would probably have been a demand for more pay.

But the Industry should by this time have secured, with little trouble, what it may now cost much to obtain, and in this, as in other things, possession is nine-tenths of the law.

We hope that the Chamber will stand fast in the difficult position which lack of ordinary foresight has placed it in. But we hardly think that the men are likely to overlook the price of gold factor, upon which Mr. Buckle laid so much stress a few days ago. Disappointing dividends for the first half of the year are not likely to camouflage the fact that the profitable aspect of the Industry has been considerably, if only temporarily, improved by the rise in the price of gold during the past fortnight. The whole affair shows a strange lack of ordinary acumen on the part of the Chamber of Mines.

We note that the Post Office Department of the British Government is to be reorganised and placed in the hands of Business men. Is it too much to hope that the direction of South Africa's great Mining Industry will similarly be improved one of these days?

CORNER HOUSE SPEECHES.

Meetings of the Rand Mines, Ltd. and Central Mining & Investment Corp., as representing the two big controlling subsidiaries of the Corner House, are always read with the greatest interest in both South Africa and Europe, since they reflect the achievements and policy of the most important Industrial concern operating in the Union. Last week we reproduced the important speech made by Sir Harry Ross Skinner at the Rand Mines, Limited, annual foregathering, and which contained many interesting statements in regard to the operation of subsidiaries, the extension of colliery interests, and the general position of and outlook for mining in South Africa. Much of what Sir Harry said was repeated and emphasised by Sir Lionel Phillips at the annual meeting of the Central Mining and Investment Corporation, held in London the other day.

Sir Lionel stated that the operations for the last year were very satisfactory under the circumstances. After adding £100,000 to the reserve fund and providing £150,000 for extra taxation, a final dividend of 6s. was recommended, but no bonus. The Corporation's holdings in Government securities and railway stocks were £1,121,000 less, but this was made up by greatly increased investments in trading undertakings; they had £690,000 more in the gold and diamond industries. Sir Lionel regarded the working costs of the Rand as far too high, and emphasised that means of reducing them must be sought. The Corporation, he stated, was making calculations in determining the grade of ore that could be mined on the basis of the standard value of gold, without reference to the exchange. The example suggested, if generally followed, would obviate the closing down of a number of mines, unless working costs were lowered, in the event of any sudden considerable reduction under that head. The Chairman stated that some of the regulations in the Transvaal regarding native labour were inimical to the sound and economical working of the mines, and were a source of loss to the mining community. Sir Sothern Holland also referred to these mining regulations as being entirely unsuitable to present conditions, and contended that the Union Government, which was so intimately concerned in the prosperity of the mines, should take the initiative in bringing about a modification of the regulations as early as possible. He pointed out, inter alia, that the addition of only two hours to the natives' day would result in a 40 per cent. increase in the capacity of underground strength without the addition of standing charges.

We find ourselves in total agreement with both these Captains of Industry on many of the matters raised in the Central Mining speeches.

We certainly think that rates of pay on the Rand are far too high for the services rendered, that the native miners require more adequate recognition, that many of the mining regulations are unduly onerous and burdensome, and that there is a general need of increased efficiency. We believe that not only on and in the mines is harder and more intelligent work required, but that there is urgent need of less blundering, more intelligent service, and longer hours in the head offices as well. We have said these things in and out of sesaon for months past, and are glad to observe that both Sir Lionel and Sir Sothern recognise the necessity for a wholesale revolution in methods on the Rand.

Turning to one or two other points raised in the speeches, we note, for instance, that Sir Lionel said — "The outlook as regards the Modderfontein East justifies the opinion that the venture is a fair mining risk." This is a much more cautious estimate of the latest and much-debated Corner House baby than the view expressed by Sir Lionel Phillips in October, 1919, when he said, in the course of an interview, that "The real richness of the Far East Rand would only be realised when the Modderfontein East commenced milling in about 18 months time." At the time Sir Lionel made this statement Modder East shares stood at the highest price they have ever reached. To-day they are quoted considerably below one-third of the price which they stood at when Sir Lionel took the general public into his confidence as to the alluring prospects of the youngest member of the Modderfontein family. Sir Lionel's latest estimate of this company is not only a more cautious one; it is probably more accurate as well.

Sir Sothern Holland, in seconding the motion, remarked "It was thought that the apathy towards South African gold shares was due to enemy holding hanging over the market, but it was inconceivable that the Union Government, which had a great stake in the mines, both financially and otherwise, would throw a large block of enemy shares on the market regardless of the consequences to South African credit. Indeed, it was believed that the Union Government was fully alive to the situation."

We, too, have very good reason for believing that the Union Government is fully alive to the situation—so alive, in fact, that the offers made by the Mining Houses for the enemy shareholdings were definitely rejected some time ago, and as an earnest of the Government's determination not to be coerced into accepting "bargain prices" it is interesting to learn that the Custodian of Enemy Property is calling upon the companies concerned to make out fresh scrip in the name of the Union of South Africa.

Notes & News.

Edendale.

We understand that the extra capital required by the Edendale Developing Syndicate, Ltd., has been guaranteed and fully subscribed. Developments are actively proceeding and the new shaft is now down 80 feet. A report from the mine during the week is to the effect that a prospecting shaft to the west of the new shaft, at a depth of 50 feet, has struck a lode of galena 54 inches wide.

* * * *

The Industrial Outlook in England.

Gradually the clouds seem to be lifting in the industrial world in England, and the news this week is decidedly better. As we go to press there are indications that the ballot of the men in regard to the latest offer from the owners will result in a substantial majority in favour of a settlement. In the cotton industry, likewise, the outlook has improved, and it may be that the good sense of all concerned will effect an early amelioration of the position in British industry generally.

* * * *

The Half-Year's Dividends.

In our next issue we hope to print our usual list of the dividend declarations for the current half-year. Meanwhile we may note the following announcements made up to the time of going to press: De Beers have declared a final dividend of 10s. per share, less Union tax of 7½ per cent., for the year ended June 30, 1921. Enyati Colliery, Ltd., interim declaration of 10 per cent., i.e., 20s. per share, payable to shareholders registered as at June 10. Buffalo Colliery, Ltd., 20 per cent., or 40s. per share, payable to shareholders registered on June 10. Sub Nigels have declared 3¾ per cent., or 9d. per share.

* * * *

A Coal Mine on the Market.

It is not often that a proved coal property comes into the open market, and the south-west portion of Steenkoolspruit, which is being put up to auction, we believe, fulfils this description. The farm adjoins, and lies between the north-west portion of the farm of the same name, lately purchased by the Pretoria Iron Works for coke producing purposes, and Van Dyk's Drift 200, secured by the "T.C.L." for its coal. The boreholes put down have proved the same series of coal seams as exist on the adjoining properties. The reports of Mr. J. R. Thom and Mr. James Gray give a high average calorific value, and four workable coal seams have been proved. The property is being put up for auction on June 29 by Mr. J. C. Burchmore.

* * * *

I. of M. M. Presidential Address.

The Bulletin of the Institution of Mining and Metallurgy for May contains the complete report of the Presidential address delivered by the new President of the Institution, Mr. F. W. Harbord. The address dealt with the general effects of the War on the metallurgical and kindred industries and covered a wide field. Industrial research bulked largely in the address; and Mr. Harbord showed how the War had given a big impetus to it in Great Britain. We hope to print extracts from Mr. Harbord's views in an early issue. Sir Robert Hadfield in returning thanks to the new President for his address paid a high tribute to his attainments.

The Busy Man's Page.

Owing to the delay in the receipt of the mails this week, the contents of our " Busy Man's Page " and " Technical Digest " have necessarily to be omitted. Next week, however, we hope to make up for the omission by including a two weeks' summary.

* * * *

The late Sir Bernard Oppenheimer.

In mining circles during the week general regret was expressed at the cabled news from London of the death of Sir Bernard Oppenheimer, the well known diamond magnate. Sir Bernard was chairman and permanent director of the South African Diamond Corporation, Ltd., chairman of the London Committee, and permanent director of Pniels, Ltd., chairman of the New Vaal River Diamond and Exploration Co. and of Kryn and Laby Metal Works, Ltd., and a director of Blaauwbosch Diamonds, Ltd. In 1917 Sir Bernard gave facilities to disabled soldiers to learn the trade of diamond cutting, and his generosity provided a factory at Brighton for the ultimate employment of 1,000 or 1,500 ex-soldiers in this important industry. He afterwards founded similar factories at Cambridge, Fort William, and Wrexham. Sir Bernard's work in this direction will long be remembered as an outstanding example of public generosity.

* * * *

Our Cable Service.

Representations have been made to us from prominent business men regarding the serious delays in the cable service. Every business man who has occasion to use the service tells the same story, and we have been asked to ventilate the matter. We gather that the Union Government is the real culprit in the matter, owing to the length and frequency of its official messages. The result is that vital business information such as product quotations is delayed, and our leading institutions, the banks and the mining houses, are kept waiting often a week for their cables. Business men complain also of the often useless and frivolous matter which is given prominence in the news cables, and for that, of course, the Reuter cable agency must take the blame.

* * * *

Alaska Gold Company Costs.

About six years ago the Alaska Juneau property announced an ambitious project of the large-scale treatment of low-grade gold ore. The mine is situated near the Alaska Treadmill mine which had made a record for the successful exploitation of large masses of low-grade ore. It may be recalled, as an example in low working costs, that the Alaska Treadmill had produced up to the end of 1914 a total of 14,778,074 tons of ore yielding 2.46 dollars per ton, from which dividends amounting to 14,885,000 dollars had been paid. Unlike the Treadmill, the Juneau mill proved an economic failure, for various reasons, notably the high cost of labour and stores due to the War. Another attempt is now being made to put the property and its neighbours, the Alaska Gastineau, on a paying basis. From 1915 to 1920, inclusive, the Gastineau produced 10,918,989 tons having an assay value of 1.02 dollars and yielding 82 cents per ton. The Juneau, between 1893 and 1920, has produced 3,828,399 tons averaging 1.11 dollars and yielding 83 cents per ton. The cost of mining (including delivery to the mill) at the Juneau has been reduced already to the remarkable figure of 20 cents per ton, and the milling to 44.63 cents, the average last year; but the resident manager, to whom much credit is due, expects to reduce the cost of milling to 20 cents per ton. At the Gastineau the cost of milling was 27 cents in 1919 and 29 cents in 1920. Moreover, it is stated in the annual report that if the prices of labour and materials had been the same in 1920 as in 1915 the total operating cost of the Alaska Gold Mines Company, owning the Gastineau, would have been 58 cents instead of 82 cents per ton. Thus it will be seen that these Alaskan companies have achieved a technical success of no little interest to the gold-mining industry, even though the roseate predictions of six years ago have failed of fulfilment.

S.W. Protectorate.

The closing of Luderitzbucht diamond fields has led to a revival of Press agitation in the South-West Protectorate. The *Algemeine Zeitung* (Windhoek) asks what has become of the general mandate condition that the circumstances of the mandated territories must be improved. One flourishing town after another, built by German energy, is going down—first Karibib, then Swakopmund, and now Luderitzbucht. Moreover, owing to the absence of diamond taxes every white man will have to bear a taxation of £85 per head per year. This will mean that numbers of artisans and others will be pushed out by economic pressure, and that the territory will be artificially depopulated. The paper advocates the compulsory working of the mines, according to existing legislation, especially as South-West diamonds are better shaped and more easily saleable than Kimberley stones.

* * * *

South African Red Cross Society.

Their Royal Highnesses Prince and Princess Arthur of Connaught have been pleased to become hon. presidents, and the Hon. the Administrators of the Cape, Natal, Orange Free State, and the Transvaal, with the Hon. Sir E. J. Buchanan, Kt., have expressed their pleasure in becoming hon. vice-presidents of the South African Red Cross Society. The Society is based on membership open to all persons interested in the work of the Society, there being four classes of membership: Certificated members (those holding the First-Aid and Home Nursing Certificates issued by the Society), ordinary members, life members (those donating a sum of not less than £5). and corporate members (firms, societies or corporations subscribing annually not less than £5). The present provincial headquarters are:—Capetown: President, the Hon. Mr. Justice Searle; Secretary, Mr. P. O. Wathes, P.O. Box 999, Capetown. Bloemfontein: President, Dr. S. M. de Kock, D.S.O., O.B.E.; Hon. Secretary, Mrs. D. D. C. Murray, M.B.E., P.O. Box 154. Transvaal: President, Sir Evelyn Wallers, K.B.E.; Secretary, Mr. Fred Rowland, O.B.E., F.C.I.S., African Board of Executors Buildings, P.O. Box 3266, Johannesburg.

* * * *

Coal Ships on Fire.

In the latest issue to hand of *Lloyds Weekly Summary*, the loss of the *Ekeland* sailing vessel is formally recorded as " On Fire: Abandoned." The vessel left Port Natal on November 5 last en route for Norway with a cargo of coal. She is the third sailing vessel definitely known to have been lost by fire from this same cause. The *Titania* sailing vessel left Durban with coal aboard, and has never since been heard of. People will say it is unwise to publish these facts, remarks the Natal *Advertiser*. " You will give Natal coal a bad name," say they; " and that will be a bad thing for the country." But does anyone suppose that the facts are not already well known throughout the coaling world? The only fruit of a hush-hush policy in this matter would be the perpetuation of the real source of the trouble – namely, the careless and inefficient shipment and trimming of export coal that too frequently takes place. There is nothing wrong with Natal coal so far as the great bulk of our collieries' output is concerned. Not only is the coal badly trimmed in many instances, but dust and other extraneous matter gets mixed with the coal, greatly increasing the danger of combustion. When we get coal shipments put aboard in perfect condition properly trimmed, we shall have seen the last of ships' fires arising from South African coal.

Our Essay Competition.

Readers are reminded that the " **Mining Journal's " Essay Competition closes on July 1st. A prize of £25 is offered for the best contribution on " How to Improve Efficiency and Lower Working Costs in and on the Mines of the Witwatersrand." A number of valuable replies already have been received and competitors are urged to send in their essays without delay.**

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The Beginning of the Cyanide Process of Gold Recovery on the Rand.

A FEW REMINISCENCES AND SUGGESTIONS.

By Andrew F. Crosse.

In the year 1891, when I had not been very long on the Rand, I was asked by a client if I thought that gold was soluble in a solution of cyanide of potassium. Well, at that time I had honestly to confess that I knew nothing about the solubility of gold in alkaline cyanide. Soon after my client's inquiry I received an invitation to be present at a trial experiment on the treatment of concentrate by cyanide. The trial was carried out in a shed on the Natal Spruit. I walked from my laboratory, which was in Von Brandis Street, to Natal Spruit across the bare veld as it was in those days. I remember going into a corrugated iron shed in which on one side there was a vat with a mechanical stirrer agitating a ton or more of concentrate from the Jumpers Gold Mining Company. This concentrate was very clean, being I believe the product of frue vanners. The heavy pyritic concentrate was kept in motion by a belt driven stirrer—the concentrate being immersed in a strong cyanide solution. If the belt slipped, as sometimes occurred, it was impossible to get the concentrate into motion again and the concentrate had to be dug out by kafirs. This concentrate assayed between five and six ounces of fine gold per ton.

Why I mention this first exhibition of the cyanide process of gold recovery on the Rand is to show what a long way we have gone since then. This start began at the wrong end, namely, treating concentrate, a comparatively coarse product, with a strong cyanide solution. The extraction of gold was not encouraging and a much better extraction of the gold was obtained at that time on rich pyritic concentrate by roasting and chlorination.

Now if the gold recovery company had begun at the other end and treated the finest product, namely, the slime, they would have soon tumbled to the fact that finely divided gold was readily and quickly dissolved in an alkaline cyanide solution. But this company was thinking more about the royalty they were trying to get from the mining industry than about improving a young but undeveloped metallurgical process.

Soon after this the idea was brought forward that as oxygen was necessary in the process of gold solution by cyanide various patents were brought forward and covered most of the oxidising agents known to chemists, but as there were, as far as I remember, no big lawsuits as regards these various oxidising agents they do not appear to have been very effective. The oxidising of a cyanide solution by peroxide of sodium, etc., was the wrong end of the stick, as I shall show later on.

Now it gradually began to dawn on the Rand metallurgist that in order to get the gold in solution the cyanide solution must get at the gold, and as is the case if the finely divided gold is locked up in the particles of pyrites and cement uniting the pebbles this gold could not be obtained in solution. Then it became a question of fine grinding and the tube mill was introduced, also improvements in amalgamation. Where you have free gold or amalgamable gold in an ore, not to catch it would be like a shopkeeper driving away all his cash customers and only dealing with the credit customers; gold obtained by amalgamation is, to my mind, ready cash.

Air Agitation.

Having given a rapid sketch of the main reasons for the improvements in gold extraction on the Witwatersrand, namely, liberating the gold contents of the ore by finer grinding and at the same time reducing the strength of the cyanide solution used, I will proceed to mention the air agitation of slime. I was the first to try this method here on the Rand when I was consulting chemist on the East Rand Proprietary; my laboratory was on the hill close to the Driefontein and Angelo battery; a Pohle air lift pump was installed for lifting the tailings before separation and treatment of sand and slime. The idea struck me that it would be a good way of agitation for a slime and cyanide treatment, so I had a connection made to my laboratory for bringing compressed air through a half-inch pipe and passing the air into a small vat having a conical bottom and a tube in the centre of the vat; I used the ordinary mixture of cyanide solution and slime and obtained a splendid extraction in a very short time.

I did not apply for a patent as I did not consider my process sufficiently new to warrant my application. Later on I was told that I was wrong and might have obtained a patent for that special application; anyhow I saved the industry some money, as an application for a patent later on failed through my evidence. Unfortunately for the trained metallurgist, most of the banket ore requires only a simple treatment.

Simple Rand Treatment.

It has proved to be more a question of mechanical handling and crushing large quantities of ore and reducing it to a fine state of division, rendering all the gold accessible to solution in cyanide of sodium; every young man on the cyanide plant knows this fact nowadays, but it took some time to find out, as I remember in 1903 on the E.R.P.M. the coarse Spitzluten concentrate was treated in a special vat for three weeks till it was found out that this extra treatment was useless. Hence the introduction of tube mills and a higher production of very fine sand not all real slime. Having ground the coarse pyritic particles the gold contents were readily soluble.

Now the product from most of the mines on the Rand, when treated as a current product, is so clean, not having had time to be oxidised, that the cyanide solution is only slightly decomposed and very little caustic lime is required to protect the solution. Of course this favourable condition of things is all altered when old tailing or slime dumps have to be treated. The first metallurgists to handle the cyanide treatment of accumulated tailings had many more troubles to contend with than occur to-day.. The quantity of organic matter and ferroso-ferric sulphate in some of the accumulated sand and slime deposits was enormous, the use of peroxide of sodium with the cyanide solution did not help matters. Sometimes even to-day the fresh material treated can be improved before treatment. I will describe my ideas as to the preliminary treatment of slime containing oxygen-absorbing materials.

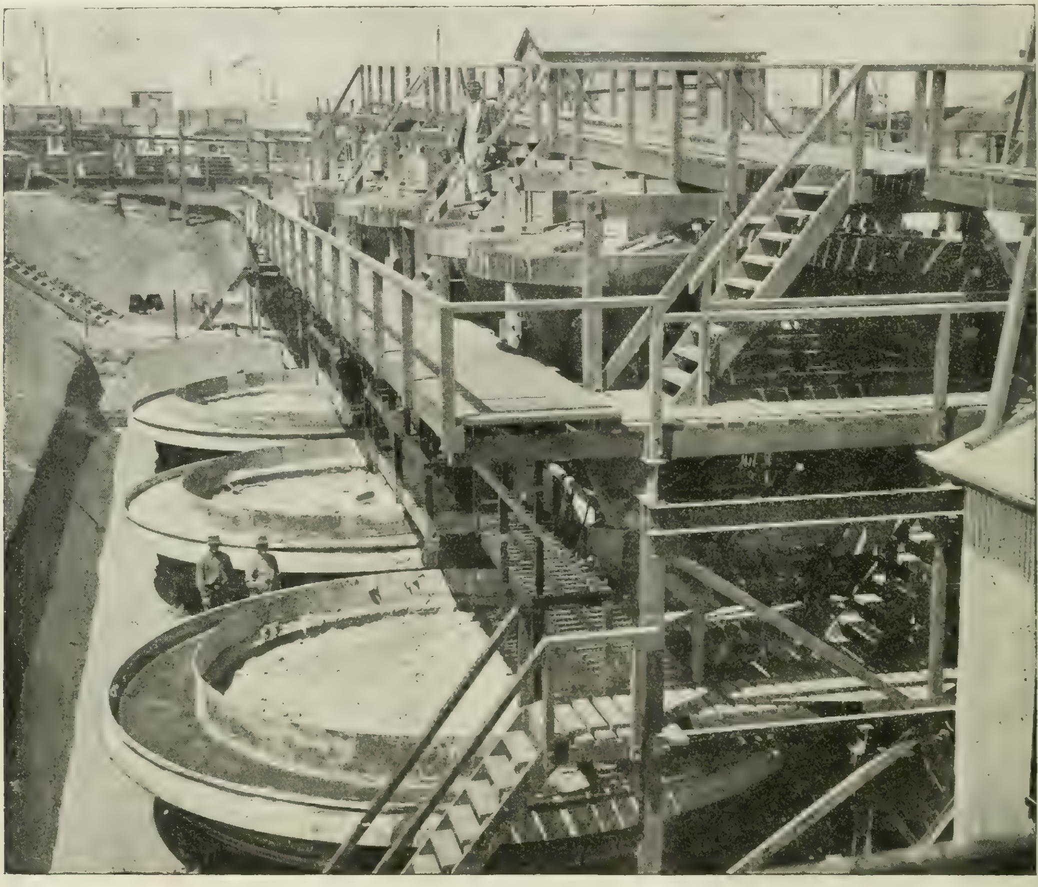
The amount of oxygen in a ton of weak cyanide solution when fully saturated with oxygen is barely 90 grams. Therefore a comparatively small amount of oxygen-absorbing material is very injurious and also produces ferrocyanide and sulphocyanide. I have carried out some interesting experiments by shaking up sand with a weak cyanide solution and saturated with air, and then determining the amount of oxygen absorbed per ton so treated; I found by the above method that one ton of sand treated at the Angelo and Driefontein battery on the E.R.P.M. absorbed about as much oxygen as would be contained in five tons of cyanide solution; under these conditions ferrocyanide and sulphocyanide were formed.

When slime is agitated by air the oxygen is replaced almost at once, but some slime even when freshly collected can be improved on by a special cheap treatment (sand also)

Consumption of Cyanide.

To put it as tersely as possible, I have found in many cases the consumption of cyanide can be reduced by a preliminary treatment, a weak alkaline solution of hypochlorite of calcium, care being taken to use rather less than required, as hypochlorite is a strong cyanicide if any undecomposed hypochlorite be left. I made some experiments on some finely ground pyritic concentrates from Barberton.

Treating this material with a 0.13 per cent. KCy solution and containing also 0.127 per cent. CaO, four pounds of cyanide of Potassium, and five and a half pounds of caustic lime were decomposed per ton of ore treated.



Portion of Simmer and Jack Cyanide Plant, showing Caldecott Cone Classifiers and Filter Tables.

A sample of the same concentrate was treated with a weak alkaline solution of hypochlorite of calcium, 2.1 pounds of available chlorine was used per ton of concentrates and 0.57 of caustic lime. The treated concentrate was washed and then only 1.3 lbs. of cyanide was decomposed and 2.7 lbs. of lime. No ferro or sulphocyanide formed. A weak solution of hypochlorite of lime in lime water does not attack gold or pyrites.

I made some tests with very pyritic ore from the Machavie gold mine with the same results.

I also made an experiment on perfectly fresh lime from the New Primrose about two and a half years ago. A very weak solution of hypochlorite of calcium containing the equivalent amount of free lime was used; the experiment was made with distilled water and there was no available chlorine left in the solution and only 0.001 per cent. CaO. The treated slime was then cyanided with a 0.03 per cent. KCy solution; there was no decomposition of cyanide. This experiment was very successful. The gold was quickly dissolved by agitation; the residue assayed contained only a trace of gold.

I do not pretend that this method is advisable everywhere, but on some of the Far East mines I know it could be used with advantage and also in the outside districts.

To wind up, may I tell a little yarn? Some years ago, before the Boer War, when I was running the assay office of the Standard Bank, the manager informed me that the Bishops were coming next morning to see the gold melted. Bishops do love gold! I showed them a leaf of gold dissolving in a dish of weak cyanide; it soon disappeared. One of the Bishops said: "What has remained on the surface?" I brought a magnifying glass, and there was one of the collects taken out of the prayer-book, quite legible. The book of gold leaf was made of an old prayer-book and printer's ink was not attacked by cyanide. I think that this appearance of a collect from the prayer-book was most suitable at an ecclesiastical demonstration.

Springs and West Springs Rumours.

We learn that there is no truth in a rumour circulating on the Far East Rand during last week to the effect that No. 3 shaft of the Springs Mines is being closed down. On the contrary, the company is preparing for an increased programme of development. With regard to No. 2 shaft of West Springs, sinking operations have been suspended in order to carry out diamond drilling from the bottom of the shaft.

Killing the Rand: Mr. W. E. Bleloch's Outspoken Views.

AN INTERVIEW WITH THE PIONEER OF THE FAR SOUTH-EAST RAND ELICITS SOME PLAIN SPEAKING

" Official interference and tyranny, stupid taxation, and resultant stagnation are killing the Rand," said Mr. W. E. Bleloch, when asked for his views on the situation. " The officials have not even the sense to foresee the result of killing their host, or if they see they don't care, and they proceed to kill him all the same."

" The town lands of Heidelberg are proclaimed as a public gold field and used like a bait to trap the prospector and his financial supporters. After they have occupied the position, paid £20,000 in claim licences, dug many trenches, put down many boreholes and proved the existence of a valuable gold bearing reef, the Mines Department brings along the heavy guns of the Geological Survey and with two long-distance shots blots the whole lot out. That is what has happened. And then, finding their intended victim is still alive, they get the Law Department moving with a trumped-up case under the Company Law—an action which resulted in ridiculous failure and was condemned by men of all shades of opinion on the Rand. That's how they have treated me," said Mr. Bleloch.

" For the Southern Van Ryn we have raised altogether £180,000 and of this the Government has exacted £30,000 for claim licences, and that mine, which, being on the great reef of the Far East Rand, has every prospect of being as great a mine as any in that famous gold field, is shut down for want of capital. The officials of the Mines Department saw to that, when they sent the cables to the High Commissioner in London last year and warned our investors off. Had it not been for these cables a round million of money to open up and develop the Southern Van Ryn mine and other mines to the south would by now have been employed for the best part of a year and the development of not one but of many mines on the southern outcrop areas of the Van Ryn Reef would have been going on—mines which would go far to make up for the dying mines of the Central Rand. Why do they do it? you ask."

" The proverbial lack of judgment, lack of imagination, and lack of individual responsibility of the official, and to these must be added in this instance personal spite because a mere prospector has proved their official experts to be wrong. That is what tyrannical officialdom uncontrolled and unreproved has done for me! " said Mr. Bleloch. " Had I not experienced it, I would not have believed it possible. It is no use saying more," he said finally. " I have expended over £5,000 of my own money in books and writings and lectures telling the people of this country of the vast stores of undeveloped gold wealth still remaining—wealth which is locked up by oppressive laws and pernicious administration. The nemesis is coming, it is here—rapidly falling revenue, a constantly narrowing basis of taxation, constantly increasing rates of taxation, a 6s. in the £ income tax on its way, a 10s. profit tax on the richest mines not unthinkable! Cannot the heads of our mining houses and the heads of our commercial houses see these things coming? Cannot the leaders of the workers see them too? Last week I stated at a meeting on the unemployment question in the Selborne Hall that if there is not an immediate complete change of policy, instead of 2,000 unemployed now we will have 20,000 unemployed within the next few years. It is nonsense to talk of a coal industry or an iron industry taking the place of our gold. It might almost be said that so far as the white population of the Rand is concerned it lives on gold, and on gold alone. Take away the gold and there will be precious little bread.

" This week I was one of those who went to see His Worship the Mayor of Johannesburg to ask him to take immediate action to bring home to the Government before Parliament rises the necessity of arresting the economic catastrophe with which the Rand gold mining industry, and consequently the whole country, is threatened."

The following is a summary of some of the statements made to the Mayor:

" It is believed that on the Central Rand only the Crown Mines, the City Deep, the Meyer and Charlton, and the Robinson Deep have any certainty of keeping in operation for more than eight years, and the lives of the two last-named are uncertain even for eight years. All the other mines are in imminent danger and many of them, probably half, will have to close down if gold falls even to 90s. per oz. With the gradual but rapid closing of the mines the railway revenues will diminish and a great part of the present State revenue will disappear. Owing to the crushing burdens of claim licences under the Gold Law and the hostility of the Mines Department, and the worrying and unnecessary regulations, all progress has been killed and new ventures have practically ceased. It is suggested (1) that the Mines Department should be reorganised and officials appointed more in sympathy with new mining enterprises undertaken by South Africans; (2) that the activities of the army of inspectors of mines and inspectors of natives be restricted to established mines producing on a large scale, and that ordinary prospecting work should go on unhampered—thus the salaries of many officials whose work is a positive hindrance to progress would be saved; (3) that interference by officials with private enterprise, like that of the cables to the High Commissioner of last year, which prevented £1,000,000 working capital coming out to open up the Van Ryn Reef at Heidelberg, be stopped, and that an impartial inquiry be made into the conduct of the officials responsible

Mr. W. E. Bleloch

for these cables; (4) that the burden of claim licences exactions be completely taken off all mining enterprise, and that the State pay the owners' share of licence moneys meantime until the production of profit stage is reached.

“Generally, that immediate steps be taken to make it possible for private enterprise to open up new gold fields on the extensions of our great gold-bearing reefs which recent discoveries have proved, and so get new outcrop mines established to take the place of the dying mines and thus save the Rand and South Africa from financial and industrial ruin.”

Extracts from letter to “The Cape Times,” April 20, 1921.

As bearing on the economic situation, I hand you the following extracts from a letter I sent to the “Cape Times” on April 22 last:—

“Both Ministers, Mr. Burton, Minister of Finance, and Mr. Jagger, Minister of Railways, propose to solve their several problems by measures of restriction. To my mind that policy is wrong, and I believe that it will prove disastrous, especially to the white people of South Africa.

“Not only is the policy wrong, but it is unnecessary.

“South Africa possesses, besides its immense expanse of healthy productive grazing country and its great areas of arable land, not one-hundredth part of which has yet been brought under cultivation, the righest and greatest gold field the world has ever known and a coal and oil shale field sufficient to supply the requirements of the Southern hemisphere for 500 to 1,000 years to come. Yet with these unequalled stores of gold which all the world wants and these wonderful resources of coal and oil our Finance and Railway Ministers are at their wits' end to make ends meet, and they see no way except along a downward path of stagnation and negation of effort, which must lead the country to ruin and its white people more and more into the depths of poor white poverty. A truly appalling fate!

“Two thousand million pounds worth of gold and ten thousand million pounds worth of coal and oil; and poor whites and debt and taxation! The thing is preposterous.

“These timid controllers of the nation's financial destiny are surely badly advised. Can they not see that the real solution is something totally different from that which they have put forward? That it lies not in restriction and cheeseparing, taking half-a crown here and five shillings there, but in a vigorous prosecution of a policy of expansion and progress; a policy which will ensure immediate development of the practically inexhaustible mineral wealth which is the heritage of this most rightly dowered but badly governed country.

“How can it be done? will be asked, and the reply is: Remove the shackles from industry and effort all round, but more especially remove the stupid restrictions and burdens imposed by the Transvaal Gold Law on all independent gold mining enterprise. Get rid of the benighted—not beknighted—O, printer!—officials who show hostility to every mining endeavour not fathered by one or the other of the old big, but now almost moribund, financial mining houses. Act on the words of the late Lord Fisher and “sack the lot.” Set free our great wealth and revenue-producing industry from their retarding influence. Get the gold out of the tens of miles of outcrop reef lying at present unworked. Use it to establish irrigation works, improve the land, build the railways. Use it to finance and open up the coal and oil shale fields, the copper and the tin and other minerals. Use it, I say, to make the great natural wealth of South Africa available.

“Instead of that policy, what do we find? The prospector and independent pioneer in mining enterprise crushed by taxation and beaten down by the active hostility of our own Mines Department. Cables sent to London which prevent £1,000,000 working capital coming out to unlock the gold of Heidelberg, and that for neither rhyme nor reason, unless it be to preserve it for these old, dying, big houses dear to the hearts of the officials.

“We find rates raised on coal traffic till the ships which came for coal have departed from our harbours and come no more; money warned off the country, and taxation piled on the people till we must wonder whether our chosen rulers are mad or bad, or both.

“The hour has come! Where is the man? From his election speeches we believed we had him in our own Prime Minister, but he is silent now, and the voice of the Government seems to be the voice of Mr. Burton and the voice of Mr. Jagger. I am, etc.,—W. E. BLELOCH.”

With regard to the last distribution of gold premiums by Messrs. Rothschild & Sons on the 14th April, 1921, the Rhodesia Chamber of Mines has received the following advice from the Secretary of Mines, viz.:—

“The price of gold on 3rd January was about £5 15s. 9d. per ounce fine. By the end of the month it had fallen to £5 6s. During February and March it remained comparatively steady, only ranging between £5 4s. 6d. and £5 7s. 2d. The average surplus distributed by Messrs. Rothschild & Sons for the quarter ended 31st March, after allowing for commissions and interest, was calculated on the basis of £1 2s. 5d. per ounce fine, making the average price of about £5 7s. 5d. Practically all the gold was taken for New York.”

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The Week in the Sharemarket.

BUSINESS STAGNANT—DIVIDENDS!—GOLD PREMIUM HIGHER.

Notwithstanding the increased premium on gold (the last quotation available being 110s. 4d.), and the brighter outlook in the Labour world in Great Britain, the whole market remains in the doldrums. On one day during the past week less than one thousand shares of all denominations changed hands on the Johannesburg Stock Exchange, and this, of course, spells simple stagnation. It is undestood that the Chamber of Mines will stand firm regarding the proposed " cut " in the miners' wages at the end of the present month, and as the Unions seem to be bent on bluffing it out, there may be a deadlock. Naturally, this is not an encouraging prospect for the Sharemarket, and it is generally hoped that the men may yet come to realize the need for falling in with the Chamber's proposals. There is strong reason to hope that the coal strike in England may be finished by the men's ballot this week, and this would provide a ray of light on the gloom. On the other hand, the sooner British industry recovers the quicker our gold premium may run off, precipitating a crisis on our poorer mines. It is noteworthy that the latest official monthly report issued by the Standard Bank sums up the Sharemarket position in the following laconic paragraph: " The market is overshadowed by the industrial troubles and uncertain outlook in Europe. The volume of business in gold shares has decreased and prices are easier. Diamond shares are neglected. The activity in the coal mining industry has not affected prices of colliery shares, which remain steady at old levels. Shares in base metal companies exhibited a tendency to rise following on improved markets for the products." The June dividend declarations were not available at the time of going to press, but there is every reason to suppose that they will be on a very conservative basis

	Fri. 10th.	Sat. 11th.	Mon. 13th.	Tues. 14th.	Wed. 15th.	Thur. 16th.
Anglo-Amer. Corp.	18 6	18 3*	18 3*	18 3*	18 3*	18 0*
Apex Mines	7 9*	7 6*	7 6*	7 6*	7 6*	7 6*
Bantjes Cons.	5 4	5 3*	5 0*	5 0*	4 9*	5 0*
Brakpan Mines	..	53 6†	54 0†		54 0†	53 6†
Breyten Colls.		5 0*				5 0*
Brick and otteries		4 0*	4 0*	4 0*	-	4 0*
Bushveld Tins	0 6*	0 6*	0 6*		0 7*	0 7*
Cassel Coals			-	30 0†	30 0†	—
Cinderella Cons.		32 6†	35 0†		—	—
City Deeps	44 0†	41 3*	-	42 6*	43 6	42 6*
Clydesdale Colls.	28 0*	28 6*	28 0*	28 0*	28 0*	28 6*
Con. Diamonds	12 0*	12 0	11 6*	11 6*	11 0	11 3*
Con. Langlaagtes	10 6*	10 6*	10 9*	11 0*	11 0*	11 0
Con. Main Reefs	10 9*	10 9*	10 9	10 6*	10 7½	10 6
Coronation Colls.			42 6*		42 6*	42 6*
Do. Freeholds	1 0†	0 9*	1 0†	0 9	0 9*	0 9*
Crown Diamonds	2 8*	2 8*	2 8*	2 8*	2 8*	2 8
Crown Mines	40 0†		16 0†	40 0†	40 0†	—
Crown Mines Debs.		-				40 0†
Daggaftn. Mines	3 4*	3 4	3 6	3 3*	3 3	3 3
E.R. Coals	2 4*		2 3*	2 4*	2 46	2 4*
E.R. Deeps	0 6*		0 6*	0 6*	0 6*	0 6*
E.P. Props.	4 4*	4 9*	4 6*	4 0a	4 6*	4 6*
E.R. Debentures	£70*	£71*	£71*	£71*	£71*	—
Eastern Golds	0 6*	0 6*	0 6*	0 6*	0 6*	0 7*
Frank Smoth Dmds.	2 9*	2 10*	2 10*	2 10*	2 9*	2 6*
Geduld Props.	51 0a	51 0†	51 0†	51 0	51 9	51 0*
Glencoe Colls.	13 6*	13 6*	13 6*	13 6*		14 0
Glynn's Lydenburgs.	10 0†	-	—	9 0†	9 0†	—
Govt. Areas	81 9	81 3*	81 3*	81 3*	80 6	80 0
Hume Pipes	16 0	16 0*	16 0*	16 0*	16 0*	16 0*
Knight Centrals	3 11*	3 11*	3 10*	3 11*	3 10*	3 10*
Lace Props.	7 0*	7 0*	7 0*	7 0*	7 0*	7 0*
Leeuwpoort Tins	10 0*	10 6*	10 6*	10 0*	10 0*	10 0*
Lydenburg Farms	5 6*	5 9*	5 9*		5 9*	5 9*
Meyer and Charltons		81 0*	81 0*	81 6*	81 9*	-
Middelvlei Est.	1 0*	1 6*	-	-	--	—
Modder B.'s	12 6	26 6*	26 3*	26 9*	26 6*	26 6*
Modder Deeps	45 0a	44 6	44 3	44 3	44 0	44 6a
Modder Easts	10 4½*	10 4½*	10 3*	10 3	10 0*	10 3
Natal Navig. Colls.	35 6*	35 0*	-		35 0*	36 0
National Banks	225 0*	225 0*	225 0*	225 0*	225 0*	-
New Era Cons.	6 6*	6 6*	6 6*	7 0†	6 6*	5 9
New Geduld Deeps	1 3*	1 4*	1 4*	1 4*	1 4*	1 4*
New Klemfonteins	5 7*	5 6	5 9	5 6*	5 6*	—
New Modders	66 9*	66 6*	66 6*	66 9	66 6*	66 0*
New State Mines	22 6*	22 9	22 6*	22 6*	22 9	22 6*
New Unifieds	4 6*	4 0*	4 0*	4 0*	4 0*	4 0*
Nigels	4 0*		4 0*	4 0*		
Nourse Mines	6 9*	7 6†	6 6*		6 6*	
Pretoria Cements	51 0*	50 0*	51 0*	51 6*	51 0*	53 0†
Princess Estates	1 0*	1 0*	1 0*	1 0*	1 0*	1 0*
Rand Nucleus	-	-	1 1*		1 3†	1 0*
Randfontein Est.	13 6	13 6	13 9	13 6*	13 6*	13 6*
Randftn. Centrals	9 0*	9 6†	9 6†	9 0*	9 6†	9 6†
Roberts Victors		6 0*	6 0*	6 0*	6 0*	6 0*
Rooibergs		5 6†	4 9*	5 3†		5 6†
Rouxvilles	1 0*	1 3*	1 3*	1 3*	1 4*	1 3*
Ryan Nigels		3 6*				-
S.A. Alkali	18 6	18 0*	17 9	17 3*	17 0*	17 3
Do. Options						5 0*
S.A. Lands		4 3*	4 3*	4 3*	4 3*	4 3*
S.A. Townships	10 9*	10 9*	10 9*	10 9*	11 0	10 9*
Southern Van Ryns	2 10*	2 10*	2 8*	3 0†	3 0†	2 9
Springs Mines	35 0	35 0*	35 0	35 0	34 9	34 6
Sub Nigels	12 0*	12 0*	12 3	12 0*	11 1½	12 0
Swaziland Tins	6 0*	6 0*	6 0*	6 0*	5 0*	6 0*
Transvaal Lands	17 6*	—	17 6*			17 6*
Trans. G.M. Est.	7 6*	7 6*		7 6*	7 6*	7 6*
Tweefontein Colls.	19 0†	19 0†		17 0*		17 0*
Transvaal Silvers	26 6	26 3*	26 3	27 6*	26 9*	26 9
Union 5 per cent.	£98	£8½*	£98½	£98½	£98½	£98
Van Ryn Deeps	73 0*	74 6b	73 9	72 6*	74 6b	73 0†
Village Deeps	7 0*	7 1*	7 0*	7 1*	7 0*	7 1*
West Rand Cons.		2 0*			2 0*	2 0*
Western Rand Est.	3 6	3 4*	3 3*	3 5*	3 4*	3 4*
West Springs	11 0*	11 3	11 0	11 0*	10 6	10 6*
Witbank Collieries	45 6*	45 0*	45 0*	45 6*	46 0*	45 0*
Witwatersrands		13 0†	13 0†			13 6*
Wit. Deeps	6 6*	6 6*	6 6*	6 6*		6 6
Wolhuters	3 4*	3 4*	3 4*	3 5	3 4*	3 4*
Zaaiplaats Tins	3 5*	3 4*	3 3*	3 3*	3 3*	3 3*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Concerning Mines and Men.

Mr. J. H. Crosby has been appointed General Manager of the Johannesburg Consolidated Investment Co., Ltd. Fill Up—

* * * *

Mr. Geo. Sneddon, General Manager of the Durban Navigation Collieries, Ltd., Natal, leaves by the " Balmoral Castle " on a visit to England and expects to return to South Africa about the end of the year.

NEW S.A.R. ROLLING STOCK.

The following statement (taken from the report of the Railways and Harbours Board) indicates the total number of locomotives and rolling stock authorised, on order, en route, or under erection at 31st December, 1920:—Locomotives, 108, £1,721,131; coaching stock, 526, £3,016,659; wagon and van stock, 4,418, £3,547,480; cranes, 10, £84,067; total cost, £8,369,337. Of the 526 (coaching stock) given above, 201 are being constructed in Union workshops at an estimated cost of £895,999; while wagon and van stock to the number of 986, involving an expenditure of £939,969, are also being erected in the Department's workshops. The stock placed in service during the year was as follows:—Locomotives, 111, £1,446,362; coaching stock, 121, £679,439; wagon and van stock, 1,917, £1,420,854; cranes, 3, £12,347; total, £3,559,002. Compared with the figures given in last year's report the stock placed in service during the past calendar year as reflected above shows appreciable increases, the numbers for 1919 being:—Locomotives, 66; tenders, 14; coaching stock, 48; wagon and van stock, 358.

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Transvaal Silver and Base Metals, Limited.

A CAREFUL EXAMINATION OF THE TECHNOLOGY AND PROSPECTS OF AN INTERESTING VENTURE.

By a Special Technical Commissioner of the "S.A. Mining and Engineering Journal."

PART II.

It is no exaggeration to say that few if any Transvaal mining flotations of the last two years have engaged so much local attention as has the successful flotation sponsored by the General Mining and Finance Corporation and known as Transvaal Silver and Base Metals. Through the courtesy of the company we have recently made a thorough investigation into the proposition, and the following account of our Special Commissioner's examination will be read with great interest by many readers.

The first portion of this valuable article appeared in our last week's issue. The second and final instalment is now given hereunder.

Mining Operations.

The shaft at No. 1 mine was sunk by the former workers to a depth of about 340 feet. It had three compartments and, due to the top 30 feet of the timber having been removed, had fallen in to some extent at the surface. Accordingly the first steps taken by the present workers were to recover the caved portion of the shaft. A steel collar set resting on concrete foundation blocks was used for the purpose of attaching the topmost timbering. Below the 30 foot depth the old timber in the shaft was found to be in good condition.

Of the three compartments in the shaft two are being used for hauling rock and men to the surface, while the third contains a ladderway, water and compressed air mains and power lines.

At present active development is taking place along the 1st and 2nd levels, while the 3rd level is being unwatered. The lode dips from nearly vertical at the surface to about 60° at the 3rd level. Underhand stopes will be used in mining the ore and the broken material passed down chutes into boxes at the lower levels, where it will be trammed to the shaft and then hauled to surface.

No. 2 shaft is being sunk by the present workers and has already reached the plane of the third level. Here also active development is taking place along the first and second levels. This shaft has three compartments similar to No. 1 shaft.

At Brakfontein the old shaft, which has only two compartments, is being stripped to a three-compartment shaft and is being retimbered. A temporary pumping plant has been installed for purposes of unwatering the old workings, and it is found that the flow of water has diminished since pumping commenced.

The initial water difficulties which occur in opening up the ore workings arise through the water carrying capacity of the porous oxidised zone. The greater portion of the water in the workings comes from this area. Wherever a rise from the first level passes into the oxidised zone a continuous stream of water flows down to the lower levels through the opening which has been made for it. The water will be coped with as follows: A sump will be made below the floor of the second level near the shaft and the water from the first level run into it. As most of the water in the mine comes from the oxidised zone, it will be caught in this sump, and will be pumped from there to the surface.

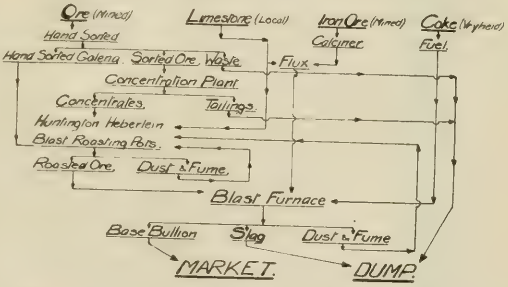
The mined ore and waste rock is brought to the surface in the trucks which are used underground for tramming. A loaded truck is run into the cage underground, hauled to the surface and run off to a track which takes it either to the temporary ore dump or waste rock dump, as the case may be. On completion of the concentration plant the ore will be run direct to the crusher house and empty trucks returned to the shaft. At present the ore from the temporary dump is being hand-sorted into rich seconds, and the rich material set aside for direct smelting in the wasting and blast furnace plant. The seconds will be eventually passed through the concentrating plant.

Metallurgical Operations.

The raw materials which will be used in the reduction works will consist of the following: Silver lead ore from the property; limestone purchased locally; iron ore mined on the property; coke from Vryheid.

The average grade of the ore so far valued in the mines is: lead 11 per cent. and silver 10.5 oz. per ton. This grade is naturally too low for profitable direct treatment in the blast furnaces, hence preliminary concentration must be effected before the ore can be smelted. By this means the grade of ore will be increased from 11 per cent. lead to about 55 per cent. lead, with a corresponding increase in the silver content.

FLOW SHEET No. 1.



Flow sheet No. 1 represents the various operations through which the raw materials will pass during the extracting process. The four stages in the process are briefly as follows:—

1. Concentration.
2. Sinter roasting of concentrates and hand-sorted galena.
3. Smelting of roasted and sintered ore.
4. Disposal of products of smelting.

Concentration.

and is being retimbered. A temporary pumping plant has

In our issue of May 7 we reproduced a full page flow-sheet, which we may call No. 2. That flow-sheet represents in detail the concentration plant and the passage of material through it. The mined ore is delivered into the ore bin, from which it passes through a jaw crusher which takes it down to 4-inch cubes. A conveyor belt here takes the crushed product to a washing trommel with ⅜in. holes. The water carries off the slimes, while the trommel delivers two products, namely, fines and oversize. The oversize passes on to a 30in. hand sorting belt, where waste rock and massive galena are removed from the ore. The former goes to the dump, while the latter is sent direct to the blast furnace (see flow sheet No. 1). It is now necessary to reduce the size of the remainder of the ore from the hand-sorting belt to that of the undersize from the trommel, hence the sorted ore passes through a $\frac{3}{4}$in. roll jaw crusher and then joins the undersize from the trommel. A conveyor belt delivers both products to the mill bin. An elevator takes the ore from this bin to a $\frac{1}{4}$in. mesh trommel, from which the oversize passes through crushing rolls and by gravity back to the mill bin elevator. The undersize is conveyed by elevator to two $\frac{1}{8}$in. mesh trommels, from which the oversize goes to two two-compartment Harz jigs. The jigs separate most of the galena from the gangere, and the former goes to the jig concentrate bin, while the latter flows into the two diaphragm cones. The undersize from the $\frac{1}{8}$in. trommels flows into two spigot classifiers, of which No. 1 delivers a — $\frac{1}{8}$in + 14 mesh product, and the other — 14 + 60 mesh material, while the — 60 material overflows. The — $\frac{1}{8}$in. + 14 and — 14 + 60 mesh products go to separate two-compartment Harz jigs, each of which gives a concentrate of galena and a tailing product. The galena goes to the jig concentrate bin, while the tailings go to the two diaphragm cones. These cones remove the coarse material, which is ground down in two Hardinge mills, from the pulp, while the finer overflow is further classified in spitzkasten. The underflow from the spitzkasten joins the crushed material from the Hardinge mills and both pass into two Dorr classifiers. The overflow from the thickening cones joins the overflow from the spitzkasten and both are dewatered in a Dorr thickener. The clear water overflowing from the thickener goes to the return water pumps, while the thick pulp joins the underflow from the thickening cones to make up a pulp of 4 water to 1 ore. The thickened pulp passes through a 250 ton minerals separation plant, where the principles of flotation are employed to separate the remaining galena from the gangue. The particular method to be used will involve subaeration. The concentrates from this plant go to the smelter bins, while the tailings are pumped to the tailing dam.

The mined ore has now been divided into five portions, namely:—

1. Hand-sorted galena.
2. Jig concentrates.
3. Flotation concentrates.
4. Waste rock.
5. Tailings.

Further treatment is only conducted on Nos. 1, 2 and 3.

Product No. 1 is coarse and above $\frac{3}{4}$in. in size, and after crushing is thus suitable for smelting in the roasting pots.

No. 2 ranges from — $\frac{1}{4}$in. to + 60, and can be considered as being a granular product which will permit a blast of air at a moderate velocity to pass through it without fear of a great dust loss. No. 3 is a very fine product and will not permit of a moderate blast passing through it without a considerable dust loss taking place.

It has already been mentioned that the roasting plant will consist of blast roasting pots, hence the concentration plant has been so designed as to give a roasting charge which is more or less granular. The jigs provide the coarse material for the charge. As the jig tailings are still rich in galena, and also because jigs cannot treat — 60 material, these two products are fine ground and treated in the flotation machines.

Blast Roasting of Concentrates.

The concentrates from the ore dressing plant are not in a condition suitable for treatment in the blast furnace. Firstly, they are in too finely divided a form and will merely be blown out of the furnace by the blast, and, further, they contain too much sulphur for the charge going to the furnace. Their preparation thus involves a process of sintering as well as roasting to remove excess sulphur. The combined roasting and sintering operation is conducted in the Huntington Heberlein blast roasting pots. The pots are made out of cast iron and have an arched perforated false bottom. They are circular in shape, about 4 feet deep, and capable of holding a 10-ton charge. The pot is mounted on a combined travelling and tipping arrangement by means of two trunions. While the blow is in action it rests on the blower box, and when complete the travelling arrangement conducts it to above the tipping floor, where its contents is discharged by inverting it. The blower box is a vessel of the same shape as the base of the pot and is connected to an air main from a Roots blower.

The charge to roasting pots is usually made up as follows: Firstly, a layer of ash is spread over the bottom to prevent sintered material from sticking to it. Next follows a layer of about 1 ton of red hot roasted material which ignites the charge when the blast is turned on, and, lastly follows the moist galena concentrates, to which has been added a certain quantity of limestone. The charge usually contains enough sulphur to support its own combustion, but if found to be deficient in this constituent some low grade carbonaceous material is usually added with the limestone. The charged pot is now brought over the blower box and made to rest thereon. The blast is turned on, and the heat from the roasted ore ignites the rest of the charge. The charge burns from the bottom upwards. The gases, dust and fume which are driven off during the blow are collected in a hood and pass into a dust settling chamber, and thence, by means of a flue to the chimney. The dust and fume losses of the charge are thus recovered and returned to the roasting pots.

The time taken to roast and sinter a charge depends on several factors, of which the more important are: the degree of desulphurisation required and the rate at which combustion can take place without completely fusing the charge. When roasting, which sometimes lasts for 16 hours, is complete, the pot is transferred to above the discharging floor. Here it is inverted and the contents falls out as a red hot agglomerated mass. It is now broken down to a size suited to subsequent treatment in the blast furnace.

Smelting of Hand-Sorted Galena and Roasted Concentrates to Base Bullion.

The blast furnace charge usually consists of the following: roasted concentrates, limestone, iron ore, and coke. The relative proportions of each used will depend on the type of slag found to be most suitable for local conditions. The quantity of fuel used is about 12 to 15 per cent. of the ore charged.

The blast to the furnace is supplied through 6 tuyers at about 1,500-3,000 cubic feet per minute. The gases passing off carry a certain quantity of dust and fume, and this is recovered by passing them through a dust settling chamber. A flue from this chamber connects it to the main flue, which leads from the blast roasting plant to the chimney. The dust and fume from the blast furnace gases are returned to the roasting pot charge. The products of the blast furnace consist of base bullion and slag. The base bullion is usually cast into pigs suitable for export. The slag is sent to the dump in suitable vessels. The furnace products are carefully sampled in order to keep a check on its working, and to estimate the value of the base bullion produce.d

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Letters to the Editor.

THE PRICE OF GOLD.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—Your leading article in the current issue queries once more the origin of the price of the standard ounce of gold.

When Sir Evelyn Wallers enunciated " that the mines were producing a commodity the enhanced cost of production of which they could not pass on to the consumer or purchaser," to my mind he stated a fallacy.

Subsequent events have demonstrated that the gold producers have passed the extra cost on to someone, but the point at issue is: why was the price of gold fixed at £4 the ounce?

Was it a mere arbitrary action of financiers of one or more nations? Or was the price fixed on the cost of production?

The writer's reading of technical and scientific matter inclines to the belief that the price of gold was originally fixed on the cost of production, viz., that after the Napoleonic wars the average ounce of gold that came into the world cost round about £4 to produce. In assessing the cost of production of the " average oz. " such factors were taken into consideration, as the alluvial gold that came into the market cheaply, the mined gold that came in dearer the capital sunk in the flotation of wild cats that produced no gold at all; all in the average ounce that the world knew cost round or about £4 to produce, therefore it was fixed accordingly.

If, after the Great War, it costs £6 the ounce to produce, why not increase the price to cover additional cost, adding a generous trifle for the unfortunate phthisis victims, also for victims to mercurial and cyanide diseases?

Mankind and nations are still utilitarian, and the country producing the half of the world's gold output cannot be expected to sell its precious heritage of the noble metals at a loss to its citizens, so that " civilisation " and " humanity " be saved.

That brand of altruism places a nation in the smelting crucible.

Another aspect—equally problematical—is that gold is a measure of values, just as the metre is a measure of distances. Why not fix something additional for this utility?

There is diversity among the controllers of the price of gold. There is unanimity among the controllers that they must have cheaper services from the employees. This, coming so soon after the assurances given by the Press and public men of all shades of opinion, that workers " would never go back to pre-war conditions " that they (the workers) were fighting for a world fit for heroes to dwell in! Sir, it is staggering news.

My knowledge of political economy is too crude to go into the question of exchange rate, but it requires little knowledge of natural science to see that class-war is recreated. For services to our currency and exchanges Mr. Strakosch got knighted, others (Crown Ministers) have become " benighted," so the writer does not propose to take the question any further, mindful of the ancient adage, " Him whom the Gods wish to destroy they first bewilder." —Permit that I remain,

Yours faithfully,

L. P. SHERIDAN.

Jeppe.

THE DISAPPEARANCE OF THE PROSPECTOR.

How the Laws Destroy Enterprise.

Sir,—To become a successful prospector requires years of perseverance and study, close observation, noting the slightest discolouration in rock changes and the difference of vegetable growth caused by changing formation, breaks, noticeable very often over country traversed, gaining special trained eyesight by years of experience in this work. Such were the men we had here in former years, men of resource, pluck, determination and unquestionable ability. Often did they pull their belts in a few holes when cash was scarce and mealie meal not too plentiful. Alas! how many are left of them with us, and why, may one ask, has the number dwindled to scarcely a baker's dozen? We look for a reason, and the only conclusion arrived at is: (1) The fault of the mining laws as they exist in administration are not conducive, but detrimental, in gaining the progressive element so essential to maintain our high standard acquired through the years of the past in securing a reputation in the mining world second to none and the envy of many. Shame be it said that the stamp of progressive prospector is a dwindling factor unreplaceable. The man who gives as a rule his all, aye, even life itself, is an asset the Transvaal can ill spare to lose. The privations the prospector has gone through are little dreamt of and never experienced by the powers who framed up the existing prospecting laws of the Transvaal. Compare Rhodesia with her laws of encouragement in the opening up of her mineral resources to the men who can, and will, and which is spelling progress right along the line. Compare conditions in the Transvaal with those of her younger sister, Rhodesia. What do we find there? The country is open, with well though-out and executed laws for prospecting and development anywhere, with assistance, backed by encouragement; so much so that licences are not put on like horse leeches as are applied here. There they wish that the country be opened up by actual work instead of licence money, which any man who has had practical prospecting experience detests paying, knowing as he does, with a limited capital to command that success must not tarry or the licence officer gets all—slow, but with absolute certainty. There they deal in yards, feet and inches; here pounds, shillings and pence; results, nil; Rhodesia success.

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What a pity it is the West Rand could not be shifted where laws exist that the man who spends his money in work done in proving a mining property has sympathy, encouragement and a helping hand absolutely necessary for the welfare of all. In conclusion, the prospecting laws as they now are in the Transvaal are impossible for the opening out of her mineral resources except on a limited scale to a limited few.

JOHN HUTT,
Prospector.

THE FUTURE OF RAND MINING.

Mr. J. J. Wessels Looks Ahead!

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—At a time when the future of the Rand looks darker than ever since its discovery, it may be well to call attention to a few facts that may relieve the prevailing gloom. It is true that if costs of production are maintained at the present level there is nothing for the gold mining industry but immediate shrinkage, followed by a period of slow decay. But costs, I am satisfied, must come down sooner or later, and as the whole future of the industry is conditioned by a reduction in that direction it may be profitable to indulge in some brief speculations based upon that hypothesis.

In the first place it cannot be too often emphasised that the Rand is mainly a low grade gold mining proposition. Not only its main reef, which Mr. Samuel Evans, with true prophetic vision, sees some day being worked in its entirety, but the upper Witwatersrand beds, known as the Kimberley series and the Elsburg series, are both gold carriers and capable under certain conditions of being profitably worked. I mean, of course, that were costs to be sufficiently reduced and the mining of these reefs to be carried out from surface—quarrying is the real term for the process—surprising results may be obtainable. I would qualify my statement further, however; there is reason to believe that the richer portions of these reefs, like those of the Far East Rand, lie in shoots, and that these shoots could be traced and defined by systematic drilling and prospecting. Some prospecting has certainly been done in this direction, but I would strongly advocate the Government embarking on a systematic investigation of these reef series by utilising shot drills, of which it now possesses a number merely used for locating water in the country districts. The opening up of the broad low grade reefs of the Rand by this means would, I am convinced, lead to the employment of all or any idle mills and would be profitable, provided mining were conducted on the "wholesale" lines which alone make the working of such deposits economically possible. When we recall that for years the Knights Deep made profits from 3½ dwt. ore, raised from a deep level mine, and how the Simmer Deep likewise milled low grade ore at a profit, it will be seen that my suggestion is not as impossible as it may seem. If ore could be hauled and crushed from such depths at a profit, mere surface quarrying at a profit should be possible also. Moreover, mining men are familiar with the results achieved at the great Alaska Treadwell mill when very low grade ore in vast quantities was treated at profit. All this sounds Utopian, of course, unless we remember to take a drastic "cutting" in costs as a condition precedent.

To achieve cost reduction and make the mining of our vast agglomerations of low grade ore possible, the Government must take an acting and direct part, and it can do this in several ways.

First: It must alter the mining laws and regulations in such a manner as to make mining as cheap as possible. Restrictive regulations and high claim licences must alike go by the board.

Second: An active drilling and prospecting programme, such as I have outlined above, must be embarked upon. I would suggest that the country south of the Southern Van Ryn to 20 miles below Heidelberg and the Central Rand from Elsburg to Langlaagte be particularly tested by drills as the upper series seem to be better defined in those districts.

Third: I would have the Government actually interest itself in reducing the cost of mining materials, plant and stores. To this end the Government should forego onerous Customs and railway rates and take a more active interest in the development of the iron and steel industry. I know that private enterprise is busy in both directions, but a great deal can be done by Government. The basis of a country's prosperity lies, after coal, in steel and iron, and the biggest direct reduction in mining store costs is, I believe, possible in the direction of a cheap iron and steel supply for other industries, including mining. If this development of the steel and iron industry is being hampered by the conflicting interests involved, then I would earnestly recommend the Government to endeavour to secure the amalgamation of those interests. The issues at stake are, I am convinced, of such great importance as to call for the Government's active assistance and intervention in this matter.

I have written, it will be seen, entirely from the point of view of the future of the country and of gold mining, apart from the interests of private shareholders and any class of employees. But, however much I have laid myself open to criticism from these two classes of interested parties, the fact remains that while they may wrangle over their respective shares, the great gold resources of the country lie fallow and untapped. Those resources are the natural heritage of the people of South Africa, and the Government will be untrue to the trust reposed in it if it fails to do the right thing and the obvious thing to make productive these dormant stores of wealth lying untouched below our feet.

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May Gold Output.

INCREASED RETURNS DESPITE NATIVE LABOUR DECREASE.

The May gold output, declared last week, shows an increase of 6,394 ozs. despite a falling off in the native labour supply and the May Labour Day stoppage. As the native labour figures, given below, show there was a decrease of nearly 3,000 in the supply, as compared with April. The chief contributors to the increased production for the month were the Modder B., City Deep and Consolidated Main Reef, with increases of 2,261, 1,866 and 1,110 ozs. respectively. Of the gold producers of the Transvaal, including the outside districts, 29 show increases and 15 decreases. A decrease of 47 ozs. is registered by the outside districts. The detailed figures for the month are as follow:

Total output	687,776 ozs.
Increase	6,394 ozs.
May value	£3,567,838
April value	£3,534,669
Witwatersrand	671,750 ozs.
Increase	6,441 ozs.
Outside districts	16,026 ozs.
Decrease	47 ozs.

Individual Returns.

	Ounces.	Increase.	Decrease.
Brakpan Mines.	22,795	319	—
City Deep	37,251	1,866	-
Con. Langlaagte	12,582	28	
Con. Main Reef	17,684	1,110	-
Crown Mines	53,348...	-	1,220
E.R.P.M.	35,858	—	271
Geduld Prop.	15,786	636	--
Geldenhuis Deep	13,240	141	--
Government Areas	53,982	-	1,509
Langlaagte Estate	12,231	227	—
Luipaards Vlei	4.656	425	—
Knight Central	7,167	—	36
Meyer and Charlton ...	8,268	169	--
Modder B.	32,938	2,261	—.
Modder Deep	23,233	317	-
Modder East	10,353	197	
New Goch	3,974	69	
New Kleinfontein	13,345	231	
New Modder	43,689	128	
New Primrose	4,493	--	87
New Unified	2,545	—	166
Randfontein	35,427	90	—
Robinson	8,035	200	—
Robinson Deep	18,148	126	—
Roodepoort U.M.R. ...	4,510	-	19
Rose Deep	13,705	525	—
Simmer and Jack	14,617	148	—
Springs Mines	19,596	965	—
Van Ryn Estate	9,497		86
Van Ryn Deep	26,264	-	841
Village Deep	15,141	278	—
West Rand Cons.	19,508	135	—
Witwatersrand	9,338	—	266
Wit. Deep	9,568	—	750
Wolhuter	7,970	—	108
Aurora West	3,015	152	—
Durban Deep	9,638	729	—
Ferreira Deep	10,967	155	—
Nourse Mines	13,999	—	351
Miscellaneous	3,389	525	—
Outside Districts.			
Sub Nigel	5,915	—	128
Transvaal G.M. Estates ...	4,828	—	365
Glynn's Lydenburg	1,352	55	—
Miscellaneous	3,931	391	--

Native Labour Returns.

The figures for May supplied by the Witwatersrand Native Labour Association and other sources show that a slight decrease has taken place in connection with the labour supply for the gold mines, amounting to nearly 3,000 natives. The number of natives employed on the last day of the month by the association and contractors was as follows:

	May.	April.
On gold mines	170,595	172,826
On coal mines	14,510	14,908
On diamond mines	1,302	1,316
	186,407	189,050

TRANSVAAL G.M. ESTATES.

The following are the particulars of the output for the month of May, 1921, in respect of the above company: Central Mines: Tons crushed, 12,300, yielding 3,397 fine ozs. Elandsdrift Mine: Tons crushed, 1,500, yielding 829 fine ozs. Vaalhoek Mine: Tons crushed, 1,820, yielding 602 fine ozs. Estimated value of month's output, £24,312; estimated profit for month, £2,366. The month's results are based on value of gold of £5 1s. 3d. net per fine oz.

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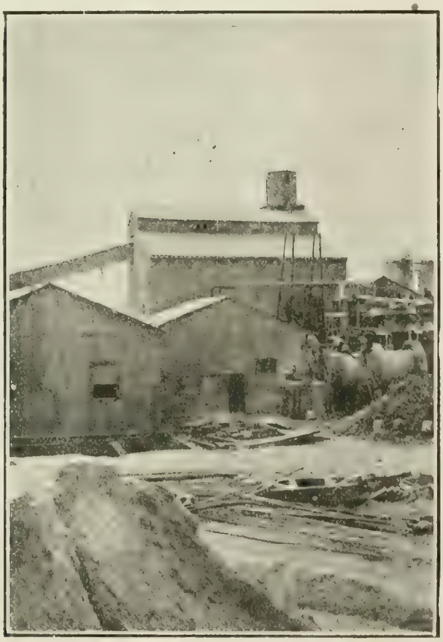
RHODESIAN SECTION.

RHODESIA'S DEEPEST MINE—IMPORTANT FUEL ECONOMIES—THE MINING POSITION DESCRIBED.

The ordinary general meeting of the Lonely Reef Gold Mining Company, Ltd., was held on May 10 at Threadneedle House, 34, Bishopsgate, E.C., Mr. C. F. Rowsell (the Chairman) presiding.

The Chairman, after dealing with the accounts, said:—As you will have seen from the report, your board have been met by a difficulty arising from the rapid exhaustion of the available supplies of wood fuel in the neighbourhood of the mine. This question has been under the consideration of the board (in consultation with Mr. Kingston, our consulting engineer) for a very considerable time, with the view of adopting the most economical and satisfactory plan to meet this great and increasing difficulty. The solution which has been adopted is the installation of a producer plant for the consumption of wood fuel. This has the effect of enormously reducing the consumption of fuel, and will enable us to make such economical use of the available supplies as will satisfactorily solve the wood difficulty. At the same time it is estimated that the use of this plant will decrease the cost of power so largely that the cost of the plant, which will be in the neighbourhood of £75,000, should be redeemed within the next three years; You will, however, recognise that so heavy an expenditure as this, even in the case of a mine of such great earning power as the Lonely Reef Mine, cannot be met without some slackening in the payment of dividends, and your board therefore decided that it would be inadvisable to declare any further dividend for the year under review, in addition to the 50 per cent. already paid. So far as the current year is concerned we have just declared a dividend of 15 per cent. This is at the same rate as we declared in 1919, in which year we paid the highest dividends which have been declared by the mine.



Treatment Plant at the Lonely Reef.

Ore Reserve Position.

Turning now to the mining position, you will see from Mr. Kingston's report, which, as usual, covers the ground very fully, that the total ore reserves at the date of his report were estimated to contain 4,170,467.4 dwts., as against 4,620,022.3 dwts. in the previous year. This shows a decrease during the year of some 449,555 dwts.; the tonnage of the reserves increased by some 3,000 tons, while the value decreased by 2.74 dwts. This change in the value of the ore reserves is, of course, brought about by the fact that the developments carried out during the year, particularly in the 21st, 22nd, and 23rd levels, have not disclosed ore of the very high values which we have been developing in the levels immediately above.

New Incline Shaft.

There is one other point in connection with the development of the mine to which I wish to draw your attention. You will see from the consulting engineer's report that preparations are now being made to sink to a much greater depth than has been reached at present. Owing to change of dip from the 15th level downwards the crosscut at the 24th level was 229 ft. long, and it has become necessary to consider some new method of working so as to avoid the

cost of these long crosscuts and the loss of time wh

cost of these long crosscuts and the loss of time which necessarily ensues. Preparations are already in progress to start a new inclin from the 24th level close to the reef. This will shorten the time required to open up new levels and make it possible to increase the rate of development so as to maintain the ore reserves. I may say that this scheme of working has not been adopted without carefully considering all the new conditions and the best methods of meeting them. In order to give the necessary power the electric winding engine on the main incline, which was designed to work to a depth of 2,000 ft., has been strengthened to work at 3,000 ft., and a larger motor has been installed to drive it.

The report and accounts were unanimously adopted.

GOVERNMENT EXAMINATIONS
Up-to-date Tuition.
MANAGER'S CERTIFICATE (METALLIFEROUS). We secured 15 Passes from 19 Entries in two recent examinations, and in the last (Jan. 1921) examination secured 7 passes from 8 entries. Another percentage record !
MANAGER'S CERTIFICATE (COAL).—New Class recently started. Candidates being enrolled.
MINE SURVEYORS' CERTIFICATES.—We have secured 55 Certificates to date, and lead with passes by more than 10 to 1.
OVERSEER'S CERTIFICATE.—We lead with passes, 1918 and 1919. 21 Certificates secured during 1920 Overseers' Class (Coal) recently started
PRELIMINARY SURVEY.—We have trained the majority of the Assistant Surveyors working in the Mines.
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NEW LOCAL FIELD WORK—MAPPING OF THE BEMBESI AREA.

The Director, Geological Survey (Mr. H. B. Maufe), in his report for 1920, says that systematic field work was carried on in the Bubi district in continuation of that done in former years, the work being carried to a varying extent into the neighbouring districts of Nyamandhlovu, Bulawayo, and Umzingwane. A large block of country, including the better known portion of the Bembesi gold belt, has now been mapped in detail.

The Director carried the mapping done in former years southwards to the head-waters of the Xoce and Bembesi rivers, and to some extent across the watershed to the south. The structure of the various belts already described in the interim reports was found to continue southwards through this area. In particular, the occurrence of a majority of the gold-quartz reefs in the belt of schists lying immediately west of the banded ironstone belt crossing the Bulawayo-Salisbury railway line west of Bembesi railway station is very marked. This belt appears to be connected southwards with the belt lying immediately west of the Mullingwane hills, in which a number of productive reefs are situated.

Mr. Macgregor carried the mapping northwards and westwards to and beyond Inyati, and also re-examined in the light of later knowledge ground in the Xoce (Kokwi) Valley, mapped in 1915. In the country around Inyati, further evidence of the succession of rock groups composing the schist belt was obtained, and Mr. Macgregor believes that by studying the form of the "pillows" in the pillow lavas, it is possible to determine the lie of the beds, and thus the local order of succession. This new point will be of considerable service in working out the structure of the gold belts. The Zwankendaba ironstone group was traced northward from the area mapped last year. Just as in the south, the majority of gold mines lie in the belt of chloritic greenstones which next succeeds the ironstone to the west. The Annasona, Huntsman, Elumba and Inbusino Mines are pyritic quartz veins dipping eastwards towards an intrusion of quartz porphyry, and the Red Boy is situated in the same belt farther to the south.

In the Xoce valley the schists are characterised by the great development of fragmental volcanic rocks in contrast to simple lavas. Sheets of dolerite, of gabbro, and of quartz porphyry with columnar structure are of frequent occurrence. The gold reefs, which mainly dip south at low angles, are pyritic quartz veins, generally with galena and often much calcite. One reef contains an appreciable amount of scheelite.

Near the confluence of the Xoce and Umgusa rivers is a broad outcrop of remarkable conglomerates, the pebbles and grains of which are composed mainly of acid igneous rocks. Beyond these, in the Tegwani river, is a thick group of slates, not greatly cleaved, and greywackes. The slates are grey, brown, red or yellow in colour, and are generally strongly banded. Mica lamprophyre, quartz porphyry and dolerite are intrusive in the shales, but the relation of this sedimentary group to the volcanic series of schists of the Bembesi gold belt is unfortunately not clear.

The Bembesi Valley.

In order to obtain some information on this point, if possible, Mr. Macgregor made a traverse down the Bembesi Valley as far as the Queen's Kraal Location, returning by way of the Lonely Mine. The coarse conglomerates, composed chiefly of felsitic pebbles, were found to occupy a synclinal trough in the greenstone and banded ironstones, forming a belt about seven miles wide on the Braemar Block. Beyond the greenstones and banded ironstones dipping south-east on Scott's and Britwell farms, shales similar to those of the Tegwani river crop out, and are followed by well-cleaved sericitic schists, in which the Calcite Mine is situated. Shales were again met with on approaching Ventnor farm, where a narrow belt of quartz porphyry separates a large area of greenstones which stretches for several miles farther down the Bembesi Valley. It is apparently these sediments which Mr. F. P. Mennell has correlated with the Lomagundi system. The lithological resemblance is not strong, and the evidence so far obtained by the Geological Survey is not sufficient to prove the nature of their relationship to the volcanic series of schists.

The ground which has already been mapped in the Bembesi gold belt is shown by the reports already made to exhibit a multitude of rock types and a most intricate structure. Some interesting conclusions bearing on the distribution of gold reefs already begin to appear, but the structure of the area to the north of that already mapped has an important bearing on these questions. It is most desirable that the mapping be continued northwards for at least one season over ground which it has been necessary to reconnoitre before the field officer concerned is transferred to another district. Otherwise the advantages to be derived from the detailed work already done will be lost.

The Association of Municipal and County Engineers (South African Province) held its annual conference at Johannesburg during the week. Important papers were read on Road-planning and Municipal Housing. Visits were paid to the Hume Pipe works at Germiston and to the Vaal River Barrage of the Rand Water Board.

* * * *

Messrs. Pauling and Co's engineers are about to proceed to Mutarara, on the Zambesi above Chindio, to put down the borings for the foundations of the great bridge over the river to connect up the Trans-Zambesi and Central Africa and Shire Highland Railway with Blantyre. The *Beira News* reports that the bridge, which will be about a mile and a half in length, will cost about a million sterling, and it is understood that the construction will commence as soon as the financial arrangements have been made and the material can be obtained from England.

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WEST INDIES
CUBA—Havana (6 Branches), Antilla, Banes, Bayamo, Caibarien, Camaguey, Camajuani, Cardenas, Ciego de Avila, Cienfuegos, Cruces, Cueto, Florida, Guantanamo, Jatibonico, La Maya, Manzanillo, Matanzas, Moron, Nuevitas, Palma Soriano, Pinar del Rio, Puerto Padre, Sagua la Grande, Sancti Spiritus, Santa Clara, Santiago de Cuba, and at fifteen other points.
PORTO RICO—San Juan, Mayaguez and Ponce. HAITI—Port-au-Prince.
DOMINICAN REPUBLIC—S. Domingo, La Romana, Puerto Plata, Sanchez, S. Pedro de Macoris and Santiago de los Caballeros.
MARTINIQUE—Fort de France, Trinité.
GUADELOUPE—Pointe-à-Pitre and Basse Terre.
BRITISH WEST INDIES—Antigua, Bahamas, Barbados, Dominica, Grenada, Jamaica, Montserrat, Nevis, St. Kitts, Trinidad and Tobago.
BRITISH GUIANA—Georgetown, New Amsterdam, &c.
BRITISH HONDURAS—Belize.

CAPITAL PAID UP & RESERVES $40,000,000
TOTAL RESOURCES OVER - - $600,000,000

ENGINEERING SECTION.

Clyde-Built Locomotives for South Africa.

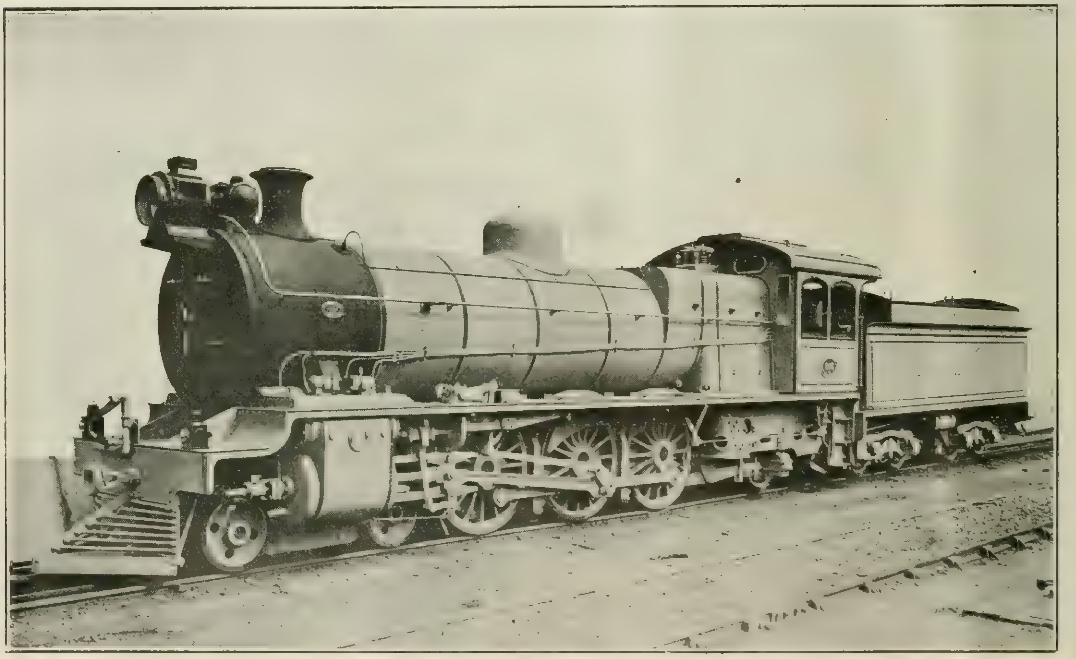
Over twenty-two thousand locomotives of every type and gauge have been delivered by the North British Locomotive Company, Limited, of Glasgow, Scotland, to all parts of the world, and since the Union of South Africa, 270 heavy engines have been delivered to the South African Government Railways, not including those which are at present in process of delivery under their contract for fifty additional locomotives, twenty for express service and thirty heavy goods engines.

The express type of locomotive is shown in the illustration. It is of the 4-6-2 class and for South African gauge railway, that is, 3 ft. 6 in. between the rails. The narrowness of the gauge when compared with the boiler necessary for these very powerful engines necessitates a very special type of framing. In engines built for English "standard gauge," that is, 4 ft. $8\frac{1}{2}$ in. between the rails, the rear portion of the boiler, which contains the firebox, can be placed between the frame plates, which are situated inside the driving wheels, and which extend from the front buffer beam to the hind footplate of the engine.

In engines for the 3 ft. 6 in. gauge, such a construction is only possible for comparatively light engines, because in this case it is necessary to considerably restrict the width of the firebox, and in order to obtain the grate area necessary for heavy engines, the length of the firebox would have to be made longer than could be properly fired by a man. With the special construction of the frame in the express locomotive shown it has been possible to obtain a boiler with a firebox measuring 5 ft. 5 in. wide and 6 ft. 8 in. long, giving a superficial area of 36 square feet. The width of the grates in boilers in locomotives in England rarely exceeds 3 ft. 5 in.

The framing used in these locomotives for South Africa is built up in two sections. The forward portion has its main plates inside the wheels, while the back portion has its main plates sufficiently far apart to allow the firebox shell to come between them. These two sections of the framing are joined together by means of a steel casting of great strength. This unusual frame design has been used successfully on South African railways for the past twenty years, and quite gets over the difficulty of operating powerful locomotives on the 3 ft. 6 in. gauge used.

The cylinders of these express locomotives are 22 in diameter and 26 in. stroke. The coupled wheels are 5 ft. in diameter, and the cylinders are fitted with piston valves 11 in. in diameter, designed with bye-pass valves. The working pressure of the boiler is 180 lbs. per square inch, and the total weight of the locomotive and tender in working order is 133.45 tons, of which the locomotive accounts for 82.35 tons



New Clyde-built Locomotive for the S.A.R.

The piston rod of these engines is 3¾ in. in diameter, and the cross-head pin is 4 in. in diameter and 4¼ in. long. The cross-head slides are 1 ft. 10 in. long and 6 in. wide, and the connecting rod has 8 ft. 8 in. centres. The main bearing on the crank pin is 6 in. in diameter and 6 in. long, and the coupling rod bearings on the crank pins of the leading, driving and hind wheels, are respectively 5 in. in diameter by 4 in. long; 7 in. in diameter by 4¾ in. long, and 5 in. in diameter by 4 in. long.

The eccentric crank on the driving wheel has a throw of 14 inches. The valve gear is of the "Walschaert" type, the lap and lead movement of the valve being operated from the cross-head, and the travel movement from the eccentric crank. The valve gear is controlled by steam reversing gear.

The rigid wheel-base of these express engines is 10¾ ft., and the total wheel-base 29 ft. 5½ in. Together with the tender the total wheel-base is about 56 ft. The boiler feed is by means of two injectors, and the boiler plates and boiler tubes are made from steel, the firebox plates being of copper. The heating surface of the tubes is 1,528 sq. ft., of the firebox 178 sq. ft., and of the superheater 292 sq. ft., giving a total heating surface of almost 2,000 sq. ft. The tractive force at 75 per cent. of boiler pressure is 28,300 lbs. The tank capacity of the tender is 4,250 gallons, and the fuel space 450 cubic feet.

Fifteen of the freight engines called for in the contract are of the 4-8-2 type, with 22 in. cylinders and 28 in. stroke. The coupled wheels are 4 ft. 9 in. in diameter, the front bogie wheels being 2 ft. 4½ in. in diameter, and the hind bogie wheels 2 ft. 9 in. in diameter. The rigid wheel-base of the locomotives is 10 ft., the total wheel-base 33 ft. 8 in., or together with the tender, 60 ft. 6¾ in. The working pressure is 185 lbs. per sq. in., and the boiler feed is by means of two injectors.

The heating surface of the boiler tubes amounts to 1,834 sq. ft., of the firebox 192 sq. ft., and of the superheater 549 sq. ft., giving a total heating surface of 2,575 sq. ft. The area of the firegrate is 40 sq. ft., and the tractive force at 75 per cent. of boiler pressure is 32,980 lbs. The weight on the coupled wheels is over 64 tons, and the combined weight of the engine and tender in working order over 143 tons. The tank capacity of the tender is 4,250 gallons, and the fuel space is 450 cubic feet

In these engines the boiler feed plates are of steel, and the firebox plates of copper. The locomotive is fitted with a steam brake on the engine and with a vacuum brake on the tender.

The remaining fifteen freight locomotives are also of the 4-8-2 type, but have 24 in. cylinders, with a 26 in. stroke. The bogie wheels are of the same sizes as mentioned for the engines last described, but the coupled wheels are only 4 ft. 3 in. in diameter. The rigid wheel-base is 9 ft., and the total locomotive wheel-base 32 ft. 1 in., or together with the tender 58 ft. 7¼ in. The working pressure is 185 lbs. per sq. in., and there are two injectors for the boiler feed

The heating surface is very large. The tubes have a heating surface of 2,301 sq. ft., the firebox 209 sq. ft., and the superheater 466 sq. ft., making a total of 2,976 sq. ft. The firegrate area is 40½ sq. ft., and the tractive force at 75 per cent. of boiler pressure is 40,740 lbs. The weight on the coupled wheels is over 69 tons, and the combined weight of the engine and tender in working order is 148 tons. The tank capacity of the tender is 4,250 gallons, and the fuel space 450 cubic feet

Chemical Engineering

POSITION AT THE S.A. ALKALI COMPANY'S PROPERTY—METHOD OF TREATMENT.

Thes management of S.A. Alkali, Ltd., started their plant for the production of carbonate of Soda towards the end of May, at their Salt Pan property near Hamaan's Kraal. On Friday, the 27th of May, a few shareholders and interested parties availed themselves of the advertised invitation and visited the property. They were welcomed by the Chairman, some other Directors and the resident staff, and the various processes in the manufacure of pure commercial carbonate of soda were explained and the machines were seen at work from the start, on "Motor Loquor," to the finished bagged product.

Some four years ago the Trona beds were very profitably worked by the Company for soda contents. These beds were the gradual accumulations resulting from the evaporation of seepages of what is now called the "Mother Liquor," and were soon exhausted.

, When the Trona beds were exhausted, it was noted the mud beds of the pan, at parts, were much impregnated with soda, and that the water in the pan, at different parts, contained verying percentages of soda and salt, and attempts were made to work, first the mud, and then the waters, economically. Then it was surmised that there might be an underground supply of better liquor, and it was decided to carefully prospect the pan by bore holes. This theory was most successfully demonstrated by a series of over twenty boreholes, which, at depths of 27 to 30 feet, proved the existance, all over the pan, below the impervious mud bottom, of apparently inexhaustible supplies of a liquid, which, an analysis, proved to be pure water with soda and salt in solution, without other impure substance at all. Each gallon of this mother liquor contains nine-tenths of a pound of commercial soda end a pound and a half of salt.

A curious fact is that the level of mother liquor, as shown by all the boreholes, is some three feet higher than the level of the waters of the pan.

The problem now was how to get the soda and salt contents of the mother liquor separately and in commercial form.

The production of soda on a commercial scale, after many delays and much anxiety, is now an accomplished fact, and the methods are as follows:—

The mother liquor is pumped from one or other of the boreholes to the plant, and is first chilled in inverted cone-shaped vessels, of which four are at present in operation.

The liquor, when chilled, precipitates its soda contents, in the form of decahydrate of soda, to the bottom of the cone, where it is trapped off, together with a certain amount of liquor, at the rate of 750 lbs. if solid decahydrate in slightly under an hour.

The liquor is separated from the decahydrate by large centrifugal separators, four of which are erected.

The decohydrate crystals, as separated by the centrifugal machines, have the appearance of new fallen snow. The chemical composition of these crystals is 66 per cent. water and 34 per cent. soda, and a problem which took some solving was how to get rid of the water of crystalization and secure carbinate of soda without any water.

The method adopted now is to let the decahydrate crystals dissolve, in a suitable vessel, in their own water of crystalization and then evaporate the water. This is done by feeding the melted decahydrate to a sugar boiling vacuum pan, which has been cleverly adapted to the production of soda instead of sugar. As the liquid exaporates crystals of monohydrate of soda are precipated and are tapped off at the rate of 1,200 lbs. of monohydrate of soda every half hour. The process is continuous. It was at one time feared that the soda would scale or encrust on the steam coils and sides of the pan, but in practice it is found there is no scaling at all.

Monohydrate of soda crystals contain 6 per cent. water of crystalization. The water of crystalization, together with adherent moisture, is dissipated in the Merson furnace, and commercial soda results.

A special separator for the adhernt water is being installed as well as belt conveyors and some other improvements intended to facilitate and cheaped production. These improvements may take a month or so to arrange.

The quality of the product is rapidly improving, the starting run on the 25th gave 87 per cent. pure soda, on the

27th the percentage of pure soda was 95, and it was anticipated in a few days more the plant would yield and maintain a product of 98 per cent. soda, which is said to be unrivalled anywhere in the world.

It is understood that more cones or chilling vessels are being ordered. They can be made locally and cost comparatively little and are quickly made.

The refrigerator will serve ten or twelve cones as easily as the four at present in operation. The centrifugal separators can cope with the product, from double the number of present cones and the vacuum pan has a capacity of nearly twice what the present cones can supply. The boiler power is also much in excess of the present machines.

The Managing Director estimates the running costs at about £2,000 a month. The present production of soda, until the improvements above-mentioned are effected, is seven tons of commercial soda daily, the local price is £26 a a ton. Any surplus over local resuirements will find a ready sale in Australia or Japan, though at a lower price.

The Company's chemist has produced salt 99 per cent. pure in his laboratory. The plant required to produce salt commercially on a large scale is the addition of another evaporating pan only.

Salt of this quality is unsurpassed anywhere in the world.

With the proposed additions which it is estimated will cost well under £20,000, it is estimated there will be a production of 25 tons of soda and 35 tons of salt daily at an operating cost of not over £2,000 a month.

DRILL DEFLECTION.

In the course of a retrospective article on diamond drilling, more especially with reference to the Transvaal, *Mine and Quarry*, issued by the Sullivan Machinery Company, says:—"The drill always recovered a true core of the reef at the point it was intersected, but due to the fact that the reef itself varied somewhat in richness, engineers had tried to hit on some place for getting a check test of the reef in the deepest holes without boring another hole, and a method of doing this was discovered by accident. On the East Rand a hole drilled by the 'K' machine had reached a depth of 4,700 ft. The water was leaking away near the bottom, so the hole was dry nearly all the way. Fifteen hundred feet of rods had been lowered in the hole, when a native made the mistake of loosening the clamp and the whole line dropped to the bottom. As there was no water, the rods struck bottom with tremendous force. In fishing them out they were so badly buckled that they coiled into all kinds of shapes when removed from the hole. All but 125 feet were recovered. The tap broke at the top of these and several other lengths were lost fishing for the tap. As a last resort an attempt was made to drill out the tools with a diamond bit. In doing this the bit was deflected to one side and a core was made in the solid rock. The hole was completed in the deflection, and it was then realised that what had happened by accident could be done intentionally. A steel wedge about 15 feet in length was designed to be fixed in the drill holes from 20 to 100 feet above the reef, depending on the distance away from the original hole it was desired to cut the reef. This method was successful, and from that time the regular practice was to deflect all deep holes. Some of them were deflected three or four times, recovering an accurate record in each case. All deflections were made with core fittings one size smaller than the original hole. The Sullivan Machinery Company later improved the method of deflecting holes and succeeded in completing deflections in the United States the same size as the original holes."

IF YOU ARE HAVING TYRE TROUBLE.

City Vulcanizing & Retreading Co., Ltd.

17 HARRISON STREET, JOHANNESBURG.
P.O. Box 7372. 'Phone 3592.
Directors: S. T. TREGASKIS. C. KEPPEL-JONES.

CONSULT THE TYRE EXPERTS.

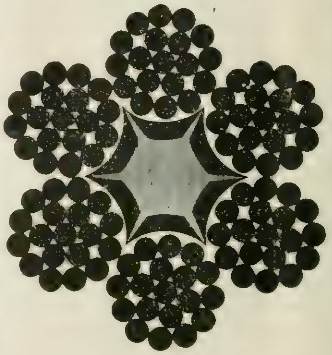
CRAVEN & SPEEDING BROS.
SUNDERLAND
ENGLAND

"WESTGARTH PATENT CORE" WIRE ROPE.

It provides greater safety than can be secured by the regulations attached to the New Mines Act, because it is impossible for any acid in the hemp core to corrode the wires in the strands. A rope with an ordinary core frequently appears to be in good condition on the exterior, whilst its interior is in a dangerous condition.

As the strands cannot crush each other there is no internal friction, and in consequence, broken wires are reduced to the minimum.

SAFEST ROPE FOR WINDING AND HAULAGE.



At a normal load there is less elongation and consequently less twist in the shaft than is usual with ropes constructed with ordinary cores.

Prevents disintegration of Hemp Core.

Sole Agents for Transvaal and Natal:

CLYDE TRADING Co., Ltd.,
Howard Buildings,
C/o Main & Loveday Streets,
JOHANNESBURG.
Box 457. 'Phone 5964.

SOLE MANUFACTURERS
"WESTGARTH PATENT CORE" WIRE ROPE

Sir Wm. Hoy on the Coal Traffic.

The latest Bulletin issued by the General Manager of the S.A.R. reviews the coal traffic on the railways with reference to Delagoa Bay and Durban. The Bulletin describes the gratifying recovery in the demand for shipment coal, and regrets the fact that the mechanical loading appliances at Delagoa Bay were out of commission from April 30 to May 16. There were 13 steamers in Delagoa Bay on May 16 for 62,404 tons of coal. At Durban the coaling was heavy, the March figures showing an improvement of 26,000 tons compared with February. Notwithstanding the stronger demand at Durban, adds the General Manager, a good supply of coal has been maintained at the Port, 39,150 tons being on hand on 9th May and 29,283 tons on 16th May. On hand in trucks, 9th May, 20,105 tons, 16th May, 10,996 tons; on ground, 9th May, 12,120 tons, 16th May, 10,560; in bins, 9th May, 6,925 tons, 16th May, 7,727; totals, 9th May, 39,150 tons, 16th May, 29,293 tons. The truck supply generally has been good, though the large number of trucks detained under load at the ports resulted in the mines being short supplied on one or two occasions. The number of trucks under load for three days and over is still very high, particularly in Natal. On 14th May, the equivalent of 656 short trucks had been delayed under load at Durban for three days and over waiting release. This reacts upon the truck supply to an extent not generally appreciated.

Miners' Wages: An Australian Example.

Telegraphic news from Melbourne shows that a definite proposal has been made by the Mount Lyell Copper Company, Tasmania, to the combined unions in connection with a continuance of the company's operations. In the course of negotiations the directors of the company informed the union representatives that it was impossible to continue operations unless a rearrangement of working hours was made, and a reduction in wages and salaries, ranging from 10 to 15 per cent., or the equivalent, obtained. The last conference that was held appointed a committee representative of all interests, and after several days' discussion the committee decided that the only method of obviating the reduction of wages was by increasing the general efficiency of the mine by the utilisation of the maximum amount of labour which could be profitably employed with a view of increasing the production of copper without incurring a proportionate increase in working costs per ton. The directors of the company placed the following proposals before the union representatives:—" (1) The combined unions undertake to recommend the underground men to accept the proposal that the hours of working underground be 40 and 48 in alternate works; (2) the unions to assist the company in securing 100 additional men to those already employed within two months; (3) should this additional labour be secured before 30th June the company to agree to continue operations for a period of four months thereafter, provided that during that period an output of ore be maintained to produce 525 tons of copper during each four-weekly period, the existing rates of wages and weekly hours of work to be continued, and the London price of electrolytic copper is not quoted below £70 a ton for 14 consecutive days; (4) if before 31st October, 1921, certain contingencies arise, a further conference be called to review the position; (5) the unions to undertake to use their best efforts to reduce absenteeism, and increase working efficiency; (6) the directors to continue to make every endeavour to effect further economies in all departments; (7) these proposals to lapse if not definitely accepted by the unions for 9th May." It was pointed out by the directors that unless both parties pulled together to effect greater efficiency on the present wages there was no alternative to a reduction of wages but to cease operations. On the 9th May the company was advised that its proposals had been rejected by the executive councils of the combined unions concerned.

TRUE ECONOMY
IN BEARING
LUBRICATION

WHY have many executives permitted the purchase of bearing oils on a price basis? Probably because bearing lubrication seems simple—the mere rubbing of one plain surface against another.

The plain facts are:

1. Inferior lubrication causes a small power loss in every bearing.
2. Even in a fair-sized plant the number of bearings runs into thousands.
3. The small individual power loss multiplied by the total number of bearings becomes a large power loss.
4. The money loss involved in this power loss may amount to serious proportions.

Shafting, when poorly lubricated, is a large waster of power. You cannot see this loss but your business feels the effect of it. Power is quickly and steadily being wasted which would otherwise be converted into production — meaning pounds, shillings and pence.

Through recommendations made by the Vacuum Oil Company, manufacturers in many fields have made decided power savings through the use of the correct Gargoyle Bearing Lubricants. In some cases this saving has been so great that the purchase of new power-producing units has been made unnecessary. The net savings have more than wiped out the slight added cost of correctly lubricated bearings.

There is a marked difference between Gargoyle Bearing Oils and oils commonly sold for the same purpose This difference begins with the crude stocks. Gargoyle Bearing Lubricants are produced only from crude oil specially chosen for their lubricating value. The ordinary bearing oil is simply one of many by-products secured in producing a wide range of petroleum products, paraffin, motor spirit, etc.

The resulting difference seldom shows to the eye. The two oils may look much alike, but *specialized* methods and *high grade* stocks always yield better bearing oil than *generalized* methods and *varying* stocks.

It will pay you to send for our booklet "Bearings and their Lubrications." It is full of interesting and valuable information and is fully illustrated. Please address our nearest Branch.

GARGOYLE
Lubricants
A grade for each type of service

VACUUM OIL C^oy
OF SOUTH AFRICA, LTD.

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

GENERAL POSITION—IRON AND STEEL—BUILDING AND TIMBER MATERIALS—TRADE CONDITIONS—LAND BANK AND THE FARMERS—ELECTRICAL GOODS—OIL FUEL—NATAL RAILWAYS AND COAL REQUIREMENTS—ELECTRIFICATION OF UNION RAILWAYS—BREVITIES.

General Position.

The past week has been marked by an almost total absence of activity and a restricted volume of business. It may at once be said that things are no worse, if not much better, than they have been of late, but June is always a poor month with the commercial community, and merchants generally are inclined to be hopeful of prospects after the turn of the current half-year. The coal dispute in Britain seems to be now assuming a more favourable aspect, and it is hoped that the end of the present month may see an end to this disastrous industrial struggle. In the matter of the proposed reduction in miners' wages there is, unfortunately, at present a deadlock, but commercial circles are fairly confident that this problem may eventually be solved by the representatives of the miners taking a broader view of the present and future condition of the gold mining industry than the present state of the gold premium appears to warrant. A warning was sounded by Sir Lionel Phillips and Sir Sothern Holland at the recent annual meeting of the Central Mining and Investment Corporation in London that mining wages and costs of stores must come down if some of our mines are to continue operations profitably in the future, and it is held that the leaders of the miners' unions will sooner or later recognise that the present high level of wages is not only not justified by the present and probable future cost of living but, if maintained, will undoubtedly hasten the end of many of our low-grade gold mining propositions. In the meantime prices of mining materials are declining. One prominent merchant is, however, of opinion that prices will in the near future, owing to the gradual but continual absorption of stocks, incline to harden, with the exception of one or two isolated lines. On the other hand, Continental shippers are to-day issuing price lists which, owing to their low quotations, are bound to command the attention of importers, enabling them to replace many staple lines at very considerably reduced prices as compared with British. German quotations for steel plates at present are about £14 per ton c.i.f., British £17 f.o.b., "to be revised when the coal strike is over." Heavy goods have undoubtedly eased off in sympathy with these lower Continental quotations. On the Commercial Exchange during the week there was a slight improvement noticed, but not of much importance.

Iron and Steel.

Business has been again quiet this week, with, however, slightly more activity on the Commercial Exchange. Latest quotations: Dunswart, 29s.; Union Steel Corporation, Ltd., ordinary sized rounds, flats, and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 55s.; ⅜ in. iron, 40s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 52s. to 62s.; ¼ in. square iron, 60s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. to 62s. 6d.; channels and joists, 47s. to 48s.; imported angles, 45s. to 47s.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in., ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. to 57s.; shovels, 60s. to 70s.; wheelbarrows, 70s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d. per 98 lb. coils; 24s. to 25s. per 68 lb. coils; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb. Lead is very firm oversea at £22 17s. 6d.; tin, £169 2s. 6d.; electrolytic copper, £76 cash, £78 forward; standard copper, £73 cash, £73 6s. 3d. forward; ordinary steel is ranging from £48 to £52 per ton.

Piping and Metal.

Inquiries for piping and fittings are fairly good and business is quite fair; buyers are beginning to see the futility of waiting longer for further drops as markets have now apparently about touched bottom and are, if anything, commencing to firm up, owing to the unsettled conditions at Home. Prices for piping, new and second-hand, are about 10 per cent. lower than they were a month ago.

Engineering Shops.

Things appear to be improving gradually, more orders now being received than has been the case for some time. The manager of an engineering works stated that in his opinion the functioning of the Commercial Exchange is not exactly adapted to the requirements of small manufacturing concerns. The subscription, it was said, is an item which in these times has to be seriously considered. Surely it should be worth the while of such organisations as the Chamber of Mines, the Railways, the Municipalities, agricultural, irrigations departments, etc., to have some office, convenient as possible of access, where the small articles that are required—blue prints, specifications, etc.—might be open for public inspection; private concerns calling for tenders are only too anxious to supply prospective tenderers with samples, etc., and all reasonable facilities. To-day, he stated, the Municipality had simply informed him that the samples of certain articles, for which he is anxious to tender, and always had been in similar cases, had been sent direct to the Commercial Exchange. As far as he was concerned these samples might as well have been sent to Timbuctoo. His only opportunity of tendering will be through the medium of some member of the Commercial Exchange coming to him for a price, and should he be successful the Municipality will have to pay two profits in place of one. Broadly speaking, he said, the Commercial Exchange may be functioning perfectly as a Commercial Exchange, but it is a more or less useless institution as far as the industries of the country are concerned, being simply a convenient open door for thousands of pounds being diverted to the markets of the world. When the Commercial Exchange was first established the industrial activities of the country were possibly scarcely worth considering, but now that the passage of years has shown the possibilities of South Africa supplying her own requirements to a large extent, it might be, he thought, that such an organisation has outlived its usefulness and might profitably be largely replaced by some far less pretentious scheme of industrial exchange. He believed that the Commercial Exchange as existing at present, is merely an open sore to industrialists generally, giving them no facilities to do business. He said it is a Commercial Exchange, but not an Industrial Exchange, and the commercial element wanted to keep it so.

Engineering Dispute in Britain.

There are prospects of this trouble being satisfactorily settled before the employers' notices of wage reductions come into operation. Trade union representatives are now conferring with the Minister of Labour.

It is reported that Mr. Struben, of Rand fame, managing director of the Vogelstruisfontein Estates, is about to return from London to resume active mining operations here.

Messrs. Hurlin and Ingram, representing a powerful syndicate, arrived here a week ago in connection with mining interests in the Northern Transvaal. It is gratifying to learn that influential men are again returning to their places so long neglected through the financial depression we have undergone in recent years, which is a sign of the times that the right people are coming back to the right place. It is thought that assured progress in the opening up of outside propositions is only a matter of time, probably sooner than most of us are inclined to believe.

Timber and Building Materials.

Business still remains dull in the absence of much building activity. Stocks are abundant. 3 x 9 deals are 1s. 4d. to 1s. 4½d.; scantlings, 1s. 3d. to 1s. 4d.; beaver board, 5d.; oregon, 9s.; pitch pine, 9s. to 9s. 6d.; floorings, 8½d. to 8¾d.; ceilings, 5¼d. to 6d.; corrugated iron, 24 gauge, 9½d. to 11d. Furniture timber: Japanese oak, 1 in. to 2 in., 1s. 8d. to 1s. 9d. per sq. ft.; Burmah teak, 20s. to 21s.; American oak, 1 in. to 3 in., 1s. 6d. per super; American black walnut, 1 in. to 4 in., 1s. 7d. to 1s. 8d. per super; West African mahogany, 1 in. upwards, 2s. 1d. to 2s. 3d. per super; 3-ply ash, 5 m.m., 10d. per super. Bricks are ruling at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; and £5 for pressed per 1,000 at yard; white lime, 7s.; unslaked, 7s. 6d.; cement, 11s. 6d. a bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 47s.; 3-ply, 55s. 3d. The supply of building operatives is at present very large.

Blue Building and Plastering Lime.

Business has been very quiet in this section, and an improvement shortly is hardly anticipated, owing to the tightness of the money market, and also to the fact that prospective house owners anticipate a drop in wages and materials, and are therefore content to wait. The Railway Administration as well as the Public Works Department have curtailed building operations as much as possible, owing to the country's finances. Housing schemes in various parts of the country have been more or less shelved. All this tends to quieten matters in the building trade. Building lime is sold at 4s. 3d. per bag and plaster lime at 5s. 3d. per bag, although inferior grades can be obtained at a fraction under these prices, but builders can easily detect the latter class of lime even without examination, owing to the small size of the bags.

Second-hand Iron and Timber Yards.

Business continues slow; but June is always a quiet month with dealers, an improvement is looked for next month. Materials are arriving in fair quantity and the yards are now well stocked. Iron is ruling at 6d. to 7d.; timber at 1s.; casements, 9s. to 25s.; mouldings from 2½d.

New Type of Stone-Cutter.

Recently a British engineering firm has introduced a type of above somewhat resembling a machine tool, which is intended mainly for cutting and moulding, but can be used also for slab and block work. The stone is cut by a carborundum wheel or diamond saw, running at 1,200 revolutions per minute. Wheels of this type are very rapid and efficient cutters of stone, and the use of them is expected to lead to large enocomies over older methods.

Agricultural Tractors.

Very satisfactory results have been achieved by a British-made tractor during a trial on a rubber estate in the Far East. Notwithstanding that all conditions were against success, the soil consisting of heavy sand mixed with clay, and that heavy rains fell before the trial, the driver was able to turn and manoeuvre with ease. The tractor showed its hauling powers by pulling two large trucks, weighing about 11 tons, uphill.

Trade Conditions.

The President of the Port Elizabeth Chamber of Commerce at the annual meeting last Monday, stated that although merchandise values may go lower when industrial conditions in Europe settle down, the present costs cannot be considered unduly dangerous. Money must, he said, continue to be tight in sympathy with our restricted buying capacity. Normal credits are not yet justified. During the period of deflation Manchester goods have dropped 50 per cent., clothing 25 per cent., iron 60 per cent., wool 75 per cent., and most other commodities in like proportion. It was time, he thought, seriously to consider whether it was not futile to ignore the commercial activities of Germany, which is supplying certain goods below American or British prices. There was, he thought, reason to believe that we had seen the worst of the financial stringency.

Electrical Goods.

Business continues very slack, with no immediately improving outlook. It is stated that two very big firms here are importing very large stocks—amounting in value to hundreds of thousands of pounds sterling—which will have the effect of reducing prices shortly. Quotations are much about the same, but the tendency is for all lines to go lower. Stocks are arriving steadily and the Continent is again exporting. A recently formed ring for the sale of porcelain materials has been broken, as it could not maintain the price.

Land Bank and the Farmers.

The new Land Bank Act authorises, inter alia, the Board to raise further funds by discounting with other banks bills of co-operative societies, overdrafts with other banks, and the issuing of "Land Bank Bills." The funds so raised are to be employed solely for the purpose of financing co-operative societies, and are not to exceed in any one year an amount equal to its cost of grain bags and farming requisites purchased or to be purchased by the co-operative societies, and 75 per cent. of the value of the produce to be financed by the bank through co-operative societies. Land Bank bills may be issued in the Union or elsewhere in sums of £100 or any multiple of £100 upon such terms as the Board may prescribe. The bills shall be regarded as included in the securities in which the Public Debt Commissioners may make temporary investments. The Act also provides for advances for fencing and the construction of silos. The operations of the bank are extended to South-West Africa.

Oil.

Pegasus motor spirit has been reduced by 2s. per case as from June 10.

Portable Petrol-Driven Crane.

A new type of portable crane has been developed by a British firm mainly for use in building operations. It is driven by a two-cylinder petrol engine, and is made in two sizes capable of lifting half a ton and one ton respectively.

MINES DEPT. EXAMS., 1920.

CERTIFICATES AWARDED INSTITUTE.

SURVEYOR'S CERTIFICATES—March, July and October (Extra) Exams 100 %, 50 % and 66 % respectively of S.A. total.

MANAGER'S CERTIFICATES.—Two last Exams. (Sept., Jan.) 17 out of total 28 in S.A.

OVERSEER'S CERTIFICATES.—Two thirds of the S.A total for year 1920 75 % for January, February, March, 1921.

COAL CERTIFICATES.—Candidates being enrolled.

Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St

A special gear enables the driver to lift a load at any speed to the maximum. The whole equipment is light and well-balanced and can be easily moved about.

Oil Plants in Britain.

An oil plant has been installed in the Barrow Corporation electricity works with such successful results that all the public service supplies, including the tramways, will now be maintained without the use of coal. Three London and North-Western locomotives are now running between Crewe and Liverpool on oil fuel. The Lily Mills, Shaw, near Oldham, one of the largest cotton-spinning concerns in Lancashire, have recently had very satisfactory trials of oil fuel. The Lots Road generating station of the London underground railways has also been fitted with sixteen boilers to burn oil fuel.

Natal Railways and Traffic.

The Minister of Railways stated in the Union Assembly this week, in reply to questions whether the railway system of Natal is able to cope with the present traffic offering, and whether the present carrying capacity of the railway limits the development of the coal areas, that extensive works have been in hand for some time with a view to improving and increasing the capacity of the system, and that further works are contemplated in that direction. He stated further that the carrying capacity of the Natal railways is much greater than the traffic at present offering. The improved facilities he regarded as adequate to prevent any interference with the due development of the Natal coal fields.

Electrification of Union Railways.

If it is true that the Union Government has decided to adopt the direct current system for the electrification of railways in South Africa, that decision may, in view of the fact that the Italian Government has discarded this system as both costly and inefficient, have to be reconsidered. The most eminent Italian electric engineers have, it is reported, after 20 years' experience, rejected the direct current for the three-phase system, which shows an estimated annual saving of £100,000 as compared with the other. It is stated that the direct current system is utterly unsatisfactory for the haulage of heavy traffic. It is therefore the duty of the Government to thoroughly investigate this important matter before launching out into any large expenditure thereon.

BREVITIES.

Wireless.

A message from Australia states that a wireless receiving apparatus, with a carrying capacity of 12,500 miles, has been erected at Observatory.

The New Transvaal Chemical Company.

The report for the year ended June 30 last showed profits amounting to £78,192, being an increase of £5,148. A dividend of 17½ per cent. was declared, and a balance of £7,273 carried forward.

Board of Trade Returns.

The Board of Trade returns for May show a big decrease as compared with the same period last year. Last month's imports totalled £86,000,000, compared with £166,000,000 in May, 1920, and exports £43,000,000 as compared with £119,000,000. Coal to the value of £1,500,000 was imported into Britain last month as against a blank sheet for May, 1920.

Unemployment Insurance Act.

The Minister of Labour in the House of Commons stated that 2,000,000 workers in Britain were wholly unemployed and 1,000,000 are on short time. The Government is paying unemployment benefit at the rate of £2,000,000 per week, while contributions amount to only £350,000 per week; the insurance fund of £22,500,000 is now exhausted. The Government is compelled therefore to reduce the benefits from July 4 to 15s. per week for men and 12s. for women, and increase the contributions. The estimated maximum liability by the Treasury under the readjusted scheme would be £16,000,000 to be repaid as things become normal

Trade with Russia.

A Berlin newspaper states that, as a result of negotiations conducted by Krassin with Hugo Stinnes, certain British and German industrial interests have concluded agreements to develop the trade and exploit the resources of Russia.

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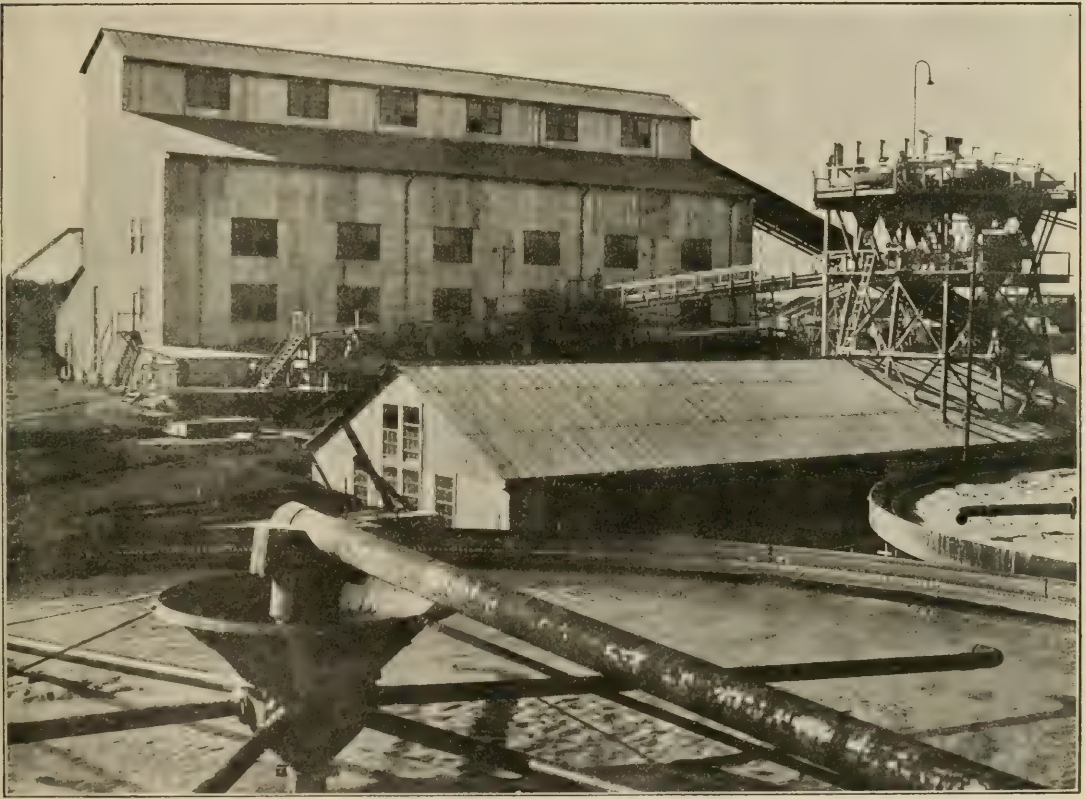
Vol. XXXII., Part I. JOHANNESBURG, TRANSVAAL, SATURDAY, JUNE 25, 1921. No. 1552.

NEW METALLURGICAL IDEAS.



The Springs Mines Mill. The capacity of this plant is to be increased by 10,000 tons per month without the erection of additional stamps. The departure from ordinary or standard Rand practice upon which the technical staff of the "C.M.S." group are embarking at Springs may lead to large and important developments in the metallurgy of gold. Elimination of gravity stamps and adoption of an all sliming method in new mills, with consequent saving in capital charges and operating costs and a better extraction, is in fact foreshadowed. We deal with this matter elsewhere in this issue.

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Mining and Metallurgical Developments at the "C.M.S." and Anglo-American Mines.

SHAFT SINKING PLANS NEARING COMPLETION—DIAMOND DRILLING AT WEST SPRINGS No. 2—BOTH DEEP SHAFTS AT BRAKPAN ON THE REEF—GOOD VALUES IN SPRINGS MINES—INTERESTING METALLURGICAL EXPERIMENTS—HOW SPRINGS MILLING CAPACITY IS TO BE INCREASED—NO FURTHER STAMPS TO BE ERECTED—A NEW METALLURGICAL DEVELOPMENT WHICH MAY HAVE HIGHLY IMPORTANT AND WIDESPREAD CONSEQUENCES.

We are able to give hereunder some interesting particulars regarding development progress at the subsidiaries of the "C.M.S."-Anglo-American group. The article deals also with some highly important metallurgical experiments which are now about to be translated into actual practice at the Springs Mill. We deal with this matter in a leading article which appears elsewhere in this issue.

During the past couple of years the C.M.S. group has successfully conducted extensive sinking operations on its various Far East Rand subsidiaries, and it must be a considerable relief to Mr. Carl Davis, the consulting engineer of this important House, to realise that the shaft-sinking activities of the group are now virtually at an end, for the time being at any rate.

West Springs.

Progress of Shaft Sinking.

Both the deep shafts of Brakpan are now on the Reef. At Springs No. 3 Shaft encountered the conglomerate beds some time ago, and development is proceeding from this point of attack.

At No 1 Shaft West Springs, the Reef was reached early in the current year, and at No. 2 West Springs sinking has been temporarily discontinued. This shaft has reached a depth of 3000 feet without encountering the Kimberley slates, which in a normal sequence of strata should have been met with at 2300 to 2400 feet.

West Springs.

It is known that a big transverse fault plane traverses the property. The No. 1 Shaft is located in the vicinity of this line of disturbance, and it is not improbable that this dyke has exerted a disturbing influence on the strata in the vicinity of No. 2 Shaft.

A diamond drill is now boring from the bottom of the No. 2 Shaft, with a view to intersecting a stratigraphical marker upon which to base future sinking plans.

It should be made clear that the extensive workings in the vicinity of No. 1 Shaft are in no way jeopardised from the points of view of safety and ventilation by the temporary suspension of sinking at No. 2 Shaft. Development operations in the northern and eastern sections of the property have been greatly facilitated by the arrangements which exist in regard to the adjacent property of Spring Mines, whereby driving from Springs has so greatly helped to exploit the western sister proposition. Indeed, West Springs can easily locate a 1000 claim mine in the area controlled from No. 1 Shaft with connections to Springs.

In the main haulage drive connection between Springs and West Springs should be effected about the end of this year, and it is interesting to note that the 8th level west haulage from Springs has now entered West Springs ground.

Good Values in Springs.

In Springs Mines development from the No. 3 Shaft in a south-westerly direction has encountered a shute of ground of very satisfactory value. The latest assays disclose an average of about 690 inch pennyweights, and in places assays as high as 1,600 inch dwts. recently have been secured.

No. 4 Shaft, Springs.

There remains to be sunk the No. 4 Shaft of Springs. This vertical has been carried down through surface soil to a depth of 90 feet, and regular sinking operations are expected to commence in about six weeks' time.

Increasing the Capacity of the Plant.

In view of the present strength of the ore reserve position of the mine relative to the crushing capacity and also the possible further increase in the ore reserve as at June 30 next, the directors of Springs Mines have just authorised the purchase of additional equipment to increase the nominal crushing capacity of the plant from 40,000 to 50,000 tons monthly to deal with such increased tonnage as may be available from the mine. This additional crushing capacity will be secured without the erection of further stamps.

For a considerable time past experiments have been proceeding at the Springs and Brakpan metallurgical plants with a view to determining whether extraction can be improved and the large capital cost entailed in the erection of gravity stamps can be dispensed with. These experiments have now reached a stage which has determined the technical control to increase the crushing capacity ten thousand tons per month by the erection of four new tube mills. This will bring the milling equipment of the mine up to 80 stamps and 12 tubes.

New Metallurgical Ideas.

It is well known that about half of the ore hoisted at these mines will pass through the headgear grizzleys when spaced at $1\frac{3}{4}$ inches. On the basis of 2,000 tons of ore hoisted at Brakpan and Springs Mines, 1,000 tons are so-called headgear fines and pass through the grizzleys. Of the remaining 1,000 tons, 400 tons are either sorted out or are used as tube mill pebbles, leaving 600 tons only to be reduced by crushers to a size in accordance with the coarser feed determined as suitable for the tube mills.

Capacity and Extraction.

It has been demonstrated by experiment with several thousands of tons of ore that by feeding these headgear fines directly into the tube mills not only is the necessity for crushing this tonnage in the mill obviated, but also that extraction may materially be improved. It is no news that at several of the Far East Rand ventures residues are higher than on the Central Rand. Standard milling practice—that is to say, ordinary methods of stamp milling followed by tube mill reduction—works to an ultimate standard product of about 85 per cent. of —90.

By the adoption of the new method described above, it has been ascertained that a product of 96 per cent. of —90 is obtained; in other words, direct tube milling under certain conditions determined by careful experiment, has resulted at Brakpan and Springs in finer grinding and a corresponding lower residue.

As to the relative cost of this method, it is obvious that on account of the elimination of stamps the capital charges in a new plant will be much lower; whilst operating charges may be less.

Further developments in connection with this departure from standard metallurgical practice may have most important results for the gold mining industry, and additional details of the new method and its economic aspects will naturally be awaited with very considerable interest.

S.A. RAILWAYS AND HARBOURS.

Important New Works Authorised during April, 1921.

Capetown: Provision of a siding and shelter for wagon repairs. Bot River-Hermanus motor service: Purchase of one $3\frac{1}{4}$ tons Clydesdale motor lorry. Bellville-Durbanville motor service: Purchase of 1 Republic $1\frac{1}{2}$ ton motor char-a-banc and one four-wheeled Highway trailer. Mossel Bay: Extension of breakwater by 750 feet. Durban: Provision of new stores receiving depot at Cato Creek. De Jagers Drift-Vryheid East: Relaying $33\frac{1}{2}$ miles of track. Ladysmith: Purchase of one lathe and steam hammer for the running shed. Jeppe: Purchase stands Nos. 684 to 687 with buildings. Volksrust: Replace lathe No. 1 by $14\frac{1}{2}$ in. centre Atlas lathe in the running shed. Mokeetsi: Provision of new station, goods shed and siding. Walvis Bay: Widening the main jetty.

Central Mining/Rand Mines Dividends.

The June dividend declaration for the mines of the Central Mining/Rand Mines Group are as follows, compared with the corresponding half of last year:—

	1921. Per cent.	1920. Per cent.
City Deep	20	$12\frac{1}{2}$
Con. Main Reef	$3\frac{3}{4}$	$6\frac{1}{2}$
Crown Mines .	10	$27\frac{1}{2}$
Modder B. .. .	40	$32\frac{1}{2}$
New Modder ..	$42\frac{1}{2}$	45
Nourse Mines .	$2\frac{1}{2}$	$3\frac{3}{4}$
Robinson	1	1
Rose Deep	$7\frac{1}{2}$	10
Village Deep	$3\frac{3}{4}$	$2\frac{1}{2}$
Rand Mines	35	60

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The Wane of Prospecting Activity in South Africa

A DEPLORABLE CIRCUMSTANCE—THE COUNTRY'S NEED OF NEW MINES—HOW BURDENSOME LEGISLATION HAS KILLED THE SMALL MAN—PROSPECTING PARTIES AND GOVERNMENT BONUS ADVOCATED—A SUGGESTION TO THE S.A. SCHOOL OF MINES.

The Union is in dire need of a revival of its great mining industries at the present time. Mines are waning and no new discoveries are coming to the fore. Burdensome mining enterprises are killing initiative, and the majority of our old prospectors have crossed the Rhodesian frontier to delve and toil in a territory where the laws are more encouraging than they are in the Union.

We dealt at considerable length last week with the poor outlook which confronts the mineral industry at the present time and urged that something should be done to bring new mineral areas into our economic scheme. We this week return to the subject, and amongst other recommendations we suggest that parties of students from the S.A. School of Mines should be sent out in charge of competent and experienced prospectors to gain valuable field knowledge and perhaps to find new mines.

Barberton, the centre of the Prospector's Paradise.

It is a lamentable fact that there are very few genuine prospectors left in the Union of South Africa. This country, with its enormous storehouses of mineral wealth, is to-day probably possessed of fewer real pioneers of the mining industry than any other country of similar size on earth. Johannesburg still contains a large quota of men who are styled prospectors, but are in reality syndicate promoters, who occasionally spend a week-end on the veld. But the genuine prospector, who toils and lives far from the madding crowd, and who, despite his lack of knowledge of the scientific principles of geology, has been responsible for the majority of mineral discoveries in every country, has in large degree disappeared from our midst.

Many of the old hands who have helped to make history have crossed the Great Divide, and have gone over into the undiscovered country for the last time. Others have sunk their all in an ungenerous earth, and having found great riches consider that they have in one way or another been cheated of their fair reward.

Harsh Mining Laws.

But the principal reason why South Africa, and particularly the Transvaal, is to-day practically shorn of prospectors is that the mining laws are far too harsh. As a practical prospector wrote in our last issue, legislation in the Union tends to ruin the prospector, and, on the contrary, the mining laws of Rhodesia encourage the seeker after mineral wealth in a wise and helpful manner. The whole essence of the Rhodesian code is the encouragement of the prospector and small mine worker in every possible manner, and particularly so during the time of initial development, when there is no income

The Rhodesian Example.

When production commences the small worker pays royalty on a sliding scale based on output. In the Union the burden of claim licences and a whole host of burdensome requirements falls exceedingly heavily on the prospector and small worker during the period of non-production. In fact, unless he has very substantial backing, the load is overwhelmingly heavy.

We would, therefore, suggest that, in view of the present sorry plight of the mining industry in this country, the mineral laws should immediately be remodelled on the lines of the Rhodesian code. We urge that in the interests of the whole community where genuine and legitimate work is being conducted claim licences should be remitted, and, in fact, that a State bonus should be awarded to anybody who can establish the existence of profitable mines, no matter what reef they may be located on, and no matter what the mineral in question may be.

Why Not Prospecting Parties of Mining Students?

There is another point which we wish to remark on in this connection.

We have here in Johannesburg a School of Mines which is training a large number of students in a wholly admirable manner. But in view of the probable early exhaustion of many of our Main Reef mines one is entitled to wonder where all these budding mining engineers are going to obtain employment.

It seems to us that it would be good business to organise these students into prospecting parties, and to send them in the charge of competent and experienced prospectors all over the mineralised areas of the Transvaal during the dry and healthy winter months. What the experienced prospector lacked in scientific knowledge the students would supply, and, vice versa, what the young mining engineers lacked in experience would be supplied by the prospector, versed through years of toil and hardship in the riddles of the veld and berg.

An Experiment Worth While.

Might not some good come of this? We think that the experiment would be well worth trying. It would at any rate give the students a most valuable experience, and the prospects of discovering new mines or of shedding valuable light on mineral deposits which have been misread in the past are sufficiently good to make the proposal attractive from a financial point of view.

De Beers and Cape Explosives Debentures.

De Beers' Company is making an issue of 7 per cent. debentures. The total amount is for £1,250,000, and it will be secured on the explosives works. For a long time past we have referred to the depressed state of the diamond trade, and pointed out that as a matter of fact it had come absolutely to a standstill. The necessity for De Beers to raise additional funds must be regarded as the outcome. Having profited by previous misfortunes, the De Beers directors had provided a "reserve for the stabiliment of the diamond trade," and in the balance-sheet at June 30 last the amount stood at the high figure of £2,357,395. This amount, however, is apparently invested in other diamond companies and kindred interests, so that, presumably, it is not possible to use this fund, the object of which, apparently, was to limit production at other mines. Thus it may be inferred that as the company had "special investments at market prices June 30, 1920, £2,448,025," some of these investments have been disposed of, but, if so, even these proceeds do not seem to have proved sufficient to hold the stock of diamonds and keep the company going on a restricted scale. Its expenses in one way and another are, of course, enormous. The fact that the company has to pay as high a rate as 7 per cent. may be accepted as an indication of the state of the Money Market. The only other debenture issue of the company is one of £1,635,495,

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IMPORTANT.

Our attention has been drawn to Mr. C. G. Elliott's remarks anent THERMIT WELDING, on page 282 of the "S.A. Mining & Engineering Journal," dated November 20, 1920,

"PLATES vs. BAR FRAMES."

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Some Forgotten Gold Producers

A BRIEF RETROSPECT OF ABANDONED MINES—PROPERTIES THAT ONCE CONTRIBUTED TO THE OUTPUT.

A glance back over the history of some of the forgotten gold producers of the Rand district—mines not, perhaps, actually the Main Reef, but near—affords food for thought at this juncture. Data regarding these properties are available in the early records of the Rand, and we have been at some pains to delve into these records of past failures.

The Orion.

Take first the case of the Orion. The company of that name was formed in 1891 and " reformed " several times later. The mine was on the Black Reef, and its production record is as follows:—

Period.	Tons crushed.	Output.
1891	6,389	£11,367
1892	22,192	25,305
1893	36,418	30,092
1894	51,850	54,264

When the mine stopped milling in June, 1895, it had produced a total of £278,677. This was not the end of its useful life, as at a later period Sir Thomas Cullinan and Mr. Lang reworked it for some time at a profit.

A Hitherto Despised Ore Body: Opening Up the South Battery Reef, Lindum Shaft, Randfontein.

The Meyer and Leeb.

This mine, also on the Black Reef, and in the neighbourhood of the Orion, was opened in 1888 and reconstructed in 1892. From 1888 to June, 1895—a bad month apparently for the Black Reef—it produced a total of 22,610 oz.

Other Black Reef Mines.

Other mines on the Black Reef wherefrom good assays were obtained, backed up in most cases by promising mill returns, were the East Orion, the Minerva, the Cornucopea, the New Golden Kopje, the Middle Black Reef G.M. Co., and the old Vesta, which was described as a 10 dwt. proposition.

The Great Britain.

The Great Britain G.M. Co.—nine miles west of Johannesburg—was formed in 1888 and reconstructed in 1895. Its object was to work the Ida reef of the Kimberley series. This reef was from six to eight feet wide and was expected to yield from nine to 12 dwt. per ton. These expectations were, however, not realised owing to the ore proving to the then known processes " highly refractory." As it was, a recovery of only 3 dwt. was obtained, and the mine, as a consequence, was closed down. With our present-day refinements of metallurgy, it is reasonable to expect that ore that may have been refractory in 1895 could now be profitably worked.

The Moral.

The point about all these forgotten ventures is that they were abandoned owing to causes that are not irremediable. A whole book could be written about each of these properties, tracing their failures through successive stages. Nearly every one has passed through the hands of several syndicates and companies, and each has had what at that time was considered a fair trial. The question is: could they to-day, with our advanced metallurgical knowledge and granted sympathetic treatment by the Government and enlightened encouragement from all concerned, be revived with any prospect of success? These forgotten records, at any rate, prove that in sections of the Black and of the Kimberley series the gold does exist in payable quantities, and may yet, possibly, under the pressure of necessity, be extracted.

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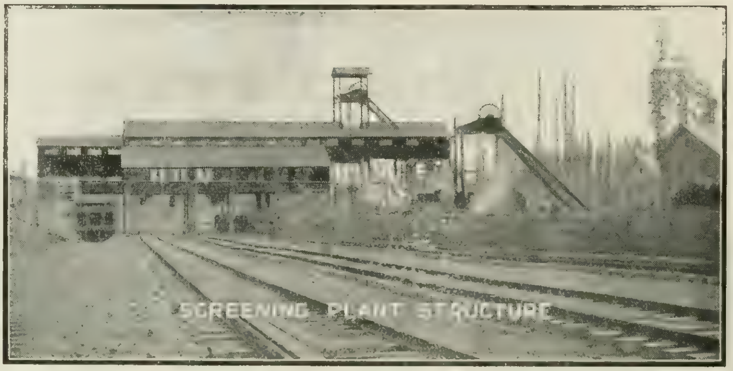

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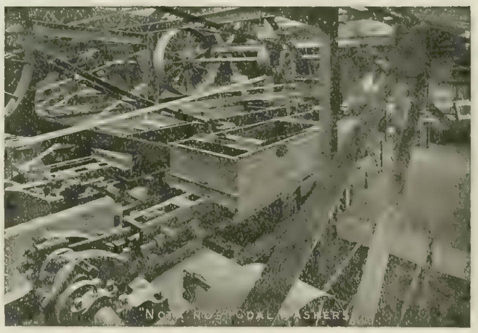

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Points from the Coal Commission's Report.

A FIRST INSTALMENT OF EXTRACTS FROM THE INFORMATIVE DOCUMENT JUST ISSUED BY THE GOVERNMENT—THE GROWTH OF SOUTH AFRICA'S COAL BUSINESS—RESOURCES AND OUTPUTS—EXPANSION OF OVERSEAS TRADE.

I.

Of the four Provinces constituting the Union, the Transvaal and Natal are the principal coal producers and the only exporters. In the Cape, coal mining never attained any large dimensions, and owing to its inferior quality, the product has been unable to hold its own against coal from the northern producers, and its output has of late years become almost negligible. In the Orange Free State considerable and increasing quantities of coal have been produced for many years, but the quality is not sufficiently good for export, even if the greater distance from the coast were not a prohibitive disadvantage.

The growth of the South African Coal Industry is shown by the following tonnages of output in tons of 2,000 lbs.:-

	Transvaal.	Natal.	O.F.S.	Cape.	Total.
1881-1885	Not available	—	-	—	—
1886-1890	—	120,015 (2 years only)	--	149,590	269,605
1891-1895	†2,473,358	740,302	—	284,667	3,498,327
1896-1900	7,186,672	1,588,048	--	831,785	9,606,505
1901-1905	9,656,986	4,326,868	**294,550	935,624	15,214,028
1906-1910	16,386,551	9,542,243	2,394,608	611,120	28,934,552
1911	4,343,680	2,679,551	482,690	89,023	7,594,944
1912	4,751,850	2,765,068	525,459	74,701	8,117,078
1913	5,225,036	2,898,726	609,973	67,481	8,001,216
1914	5,157,268	2,567,817	609,217	53,621	8,477,923
1915	5,202,805	2,304,116	727,553	16,850	8,281,324
1916	6,136,913	3,066,261	762,576	41,752	10,007,502
1917	6,641,229	2,890,296	843,095	8,300	10,382,920
1918	6,438,961	2,607,133	826,577	4,654	9,877,325
1919	6,622,313	2,801,004	838,059	4,759	10,266,135
1920	7,180,124	3,321,594	966,034	5,700	11,473,452

** Two years only, viz., 1904-1905. No records available for previous years.

† Three years only, viz., 1894-1896. No records available for previous years.

South Africa's Place in the World's Coal Industry.

Although the industry has shown considerable expansion during the last ten years, and although the value of its produce is, next to gold and diamonds, the third highest amongst the mineral products of the Union, the output of our collieries is very small compared to that of the rest of the world, as the following figures show:—

Country	Output of Coal (tons of 2,000 lbs.)	Latest year for which figures available.
United States of America	556,516,000	1920
United Kingdom	229,295,000	1920
Germany (excluding Ruhr and Upper Silesia) ...	131,346,000	1920
Ruhr	88,250,000	1920
Japan	33,970,000	1919
Upper Silesia	31,686,000	1920
Belgium	22,413,000	1920
France	21,863,000	1919
India	21,759,000	1919
Canada	14,450,000	1920
Australia	11,799,000	1919
Union of South Africa ...	11,473,452	1920
Spain	6,135,000	1918
Holland	3,402,000	1919
Italy	1,158,000	1920
Malay States	191,000	1920

The World's Coal Resources.

South Africa occupies a similarly humble rank when its total coal resources are compared to those of the rest of the world, as the following data show:—

Country	Estimated Coal Resources. (tons of 2,000 lbs.)
Great Britain and Ireland. . ..	189,533,000,000
France	17,583,000,000
Germany	423,356,000,000
Canada	1,234,269,000,000
United States of America	3,838,657,000,000
Argentine	5,000,000
China	995,587,000,000
Japan	7,970,000,000
India	79,001,000,000
Australia	165,572,000,000
New Zealand	3,386,000,000
Belgian Congo	990,000,000
Rhodesia	569,000,000
Union of South Africa	56,200,000,000
All other Countries	384,875,000,000
Total	7,397,553,000,000

Union of South Africa's Percentage to total=0.74.

These estimates of the coal resources of the world are to be regarded as very rough approximations. In South Africa, at all events, the information on which the estimate was based was of the most meagre description, and the position in such countries as the United States of America, Canada, Australia, and China is hardly any better. The estimate includes all classes of coal, and comprises varieties which at present are not utilised, as being either of too poor a quality or unsaleable for other reasons.

It may be added, however, that while South Africa may occupy a low position in the list of coal-producing countries, the value of the present output is of considerable importance to the country.

The Railway's Share.

The Railway Revenue derived from coal during the year 1920 was	£5,201,183
While the income derived by fhe Collieries from coal sold was	4,506,572
or a total of	£9,707,755

The relationship in the railway receipts between coal and other traffic for the year 1920 was as follows:—

	£	%
Goods and Minerals (other than coal)	9,665,943	42.1
Passengers	6,049,916	26.3
Coal	5,201,183	22.6
Livestock	721,409	3.1
Parcels	631,754	2.8
Miscellaneous	623,065	2.7
Other Traffic Receipts	80,182	0.4
	22,973,452	100.0

From this point of view alone it appears to the Commission that every reasonable step should be taken not only to maintain this important industry, but to strengthen and expand it in every possible way.

The position of South Africa as an exporter of coal relatively to other countries is shown in the following table:—

	(Tons of 2,000 lbs.) 1912.	1917.
United States of America ...	19,811,680	—
United Kingdom	67,035,848	37,800,705
Germany	34,321,852	—
Canada	1,583,782	1,954,024
France	Nil.	—
Belgium	5,681,000	—
India	874,199	832,332
Japan	3,470,000	–
Australia	2,152,385	646,552
China	Nil.	—
Union of South Africa	389,410	591,754

These figures show that while in 1912 South Africa produced 0.65 per cent. of the world's output, it accounted in that year for 0.3 per cent. of the coal exported from all countries. In 1920 the export of South African coal had risen to 1,394,793 tons, but statistics for other countries are not available. Bunker coal is not included in these figures.

Growth of Overseas Trade.

The growth of the South African export and bunker trade, including coal shipped to Union Ports during the 20 years is shown by the following figures in tons of 2,000 lbs.:—

	Transvaal.	Natal.	Total.
1901	—	359,516	359,516
1902	—	268,247	268,247
1903	577	317,306	317,883
1904	29	443,047	443,076
1905	—	679,256	679,256
1906	70	787,214	787,284
1907	3	1,110,220	1,110,223
1908	—	1,296,616	1,296,616
1909	4	1,388,596	1,388,600
1910	155,296	1,757,794	1,913,090
1911	113,667	1,808,997	1,922,664
1912	363,270	1,835,297	2,198,567
1913	669,249	1,886,570	2,555,819
1914	579,419	1,594,595	2,174,015
1915	458,996	1,361,970	1,820,966
1916	738,358	1,708,405	2,446,763
1917	861,761	1,555,561	2,417,322
1918	767,146	1,340,440	2,107,586
1919	789,099	1,382,192	2,171,291
1920	1,122,500	1,774,912	2,897,412

It will be evident from the foregoing table that the shipment trade has been and still remains principally in the hands of the Natal collieries, but that there has been practically no expansion for ten years, while the Transvaal collieries have during recent years considerably increased their tonnages in this line of business.

In the Transvaal the coal industry, like many others, owes its inception and its principal expansion to the gold mines of the Witwatersrand. In the early days, the comparatively low-grade coals occurring close to the gold mines were the principal source of fuel supply for these mines, but with the extension of railway facilities and the discovery of better quality coal in the Witbank area, the collieries in this latter district gradually took up the commanding position in the Transvaal coal trade. The quality of Witbank coal was such that it enabled an export trade through Delagoa Bay to be gradually built up. The outlet for Transvaal coal is mainly Delagoa Bay, but a proportion of the bunker coal is also railed to Cape Town and shipped there. At the present day, the great bulk of the coal produced in the Transvaal is utilised for internal consumption, and only 16 per cent. of the output is sold for shipping purposes.

In Natal, the history of the trade is a different one. The general excellence of Natal coal, combined with the geographical position of Natal, had the effect of establishing for it a good position in the trade for bunker purposes. The export of Natal coal was, however, restricted by the competition of British, Australian, Indian, and Japanese coals. Although Durban may be nearer to the Eastern competitive areas than is Great Britain, the greater distance of the Natal collieries from the port, coupled with insufficient railway facilities and the difficulty of finding a return cargo for ships engaging in this business, militated against any extensive development of an export trade. The great world scarcity of coal during the war and after the war has, however, led to a fairly considerable demand for Natal coal in Aden, East Africa, and other Indian Ocean ports. In 1920, the shipment trade, including coal railed overland for bunkering ships at Table Bay, took 58 per cent. of the output of the Natal collieries. The percentage in value is, of course, considerably greater owing to the prices for shipment coal being higher than for local consumption.

[*Further extracts from the Commission's Report will appear in our next issue.*]

The Old Way: Loading Coal by Hand at the Point, Durban.

The Komati Coal Fields.

RAILWAY RATES AND PAST EXPERIENCE—A CRITICAL VIEW—THE BIG HOUSE INTERESTS.

(By a Special Correspondent.)

The brief article appearing in our last issue on the subject of the Komati coal fields and the acquisition of large areas there by leading Rand houses has attracted a great deal of attention. We may now state that one of the houses concerned is the Anglo American-Consolidated Mines Selection group. The name of the other firm is well known but in view of the desire to maintain secrecy exhibited by the house, which has secured 2,639 acres, we will not at the moment divulge anything more. So far this field has not enjoyed the reputation of containing any very high grade coal. But it has its champions, and the following article from a correspondent who has in the past investigated this area will doubtless be read with much interest.

The Komati coal field is a long narrow field. It extends from about the southern portion of Swaziland right North to beyond the Delagoa Bay Railway and the Crocodile River. Its width in Swaziland and the Transvaal will be from six miles to twenty miles or more. Its Eastern side is lost under the igneous flows which form the Lembombo range of hills.

Throughout its whole length the strata has a dip towards the East of from 5 to 10 degrees. In this it differs from all other South African coalfields except that of Somkeli in Zululand.

For reasons given further on, very little work has been done at Komati, and what coals have been seen have given very indifferent results. The seams have great thicknesses. One, cut in a borehole on the S.A.R. Reserve, is over 30 feet thick. All the coals carry a very high percentage of ash and are anthracitic. In these points they have a marked resemblance to the coals at Somkeli.

South African Coal en route to the Coast.

Short Haul to the Coast.

The distance to Delagoa is 58 miles from Komati Poort, but the coals are found nearer Tenbosch, which is 67 miles from Delagoa Bay. All the ground between the Crocodile River and the Swazi Border is Government ground except two farms belonging to the T.C.L., and all is pegable under the Transvaal Law, except the Komati Poort Town Lands and the Railway Reserve.

The Cause of Non-Working.

First and last, the cause of development here being blocked is the railway and its policy. The Railway Reserve straddles across the line, and anyone wishing to commence operations will have to face putting in a railway from one to three miles long. The S.A.R. have about 12 square miles reserved. They have held it for over 20 years. They have never spent a shilling in trying to prove their ground. The Mines Department have pressed them to "get on or get out," but it seems impossible to move them.

Rates.

Previous to June 5, 1916, the rate from Tenbosch was 3s. 6d. per ton, less 1s., when coal was exported, and for local consumption in Delagoa 6s. per ton. The rates at the same date from Witbank to Delagoa were 6s. 1d., with 1s. rebate on export.

There was thus only a pull of 2s. 7d. per ton in favour of the low veld coalfield, the railways being content to haul Witbank coal an extra 209 miles over one of the heaviest graded lines in the Union for 2s. 7d. per ton!

The collieries at Witbank are firmly entrenched. They have big regular seams. They have no competitors for Delagoa trade, and the railways support them. They had no desire to go to the low veld, and nobody but a tool would think of spending money in an unhealthy district with heavy railway construction to face and the knowledge that the up-country collieries with their organisation would crush them at once. The writer examined this field thoroughly in 1913 and 1915, and is satisfied it has immense possibilities, but at that time there was no inducement to do anything. The railway rates gave no encouragement. The next time I saw the field was a year ago, after my return from overseas. I then spent two days verifying some previous observations, but Sir W. Hoy and his Railway Board had been busy with the rates and there was no hope of inducing anyone to look at business away from well-established districts. Now, the statement is made that this district is to have a rate giving it a pull of 8s. over the older districts. When before the Coal Commission I strenuously advocated rates fixed on a pure mileage basis and no cutting and carving at these to suit individuals or districts. Twenty years ago the most of the Komati field was pegged, and by people who would have spent money. The Railway Reserve kept everyone back from the railway. The sympathetic treatment for Witbank gave the district no pull to compensate for its disadvantages in the way of climate, etc. I, with many others, spent money (our own money) on proving the coals. Now the big houses step in and the proportion of rates is said to be in their favour to the extent of 8s. per ton. For the past two years the Mines Department have been vainly trying to get the Railway Reserve abandoned so as to throw it open to the public. The next thing we may expect to hear will perhaps be that the big houses are enlarging their areas.

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"Syrhads."

The Improving Outlook for Tin.

PRICE ON THE TURN?—DORMANT MINES THAT MAY BE RE-STARTED—POSITION IN THE EASTERN AND AMERICAN MARKETS.

We recently quoted an authority as saying that a "call option" on tin is at present an attractive operation, and there is no doubt that the price of the metal is bound soon to improve. For the month of April the tin sales and shipments from the Union amounted to 100 tons, valued at £10,868, a decrease of 136 tons and in value £11,748 on March.

Some Transvaal Mines and Prospects.

The Groenfontein tin mine made a profit in 1920 of £13,208, although we know that the slump in the metal did not begin till somewhat late in the year. When, however, tin fell below a certain price, it was decided to shut down the mill, to curtail development, and only to continue exploratory work of a tentative kind. It is the last-mentioned that is now being pursued; but operations on the former scale will be resumed immediately the price of the metal becomes remunerative, as all the necessary arrangements have been made.

At the Mutue Fides tin mine there has been a lack of water, which,, combined with poor values, have made it only possible for the mine to be worked for a portion of the year, during which the loss was £1,263. Prospecting and development work have alike proved disappointing, and the mine has been closed down since the end of February of this year. It has, however, to its credit during the period of existence a profit of £38,000, after paying all costs, including that of the plant, which remains a realisable asset. We understand that the mine has been let on tribute to a well-known Randite, who has been successful with tin in the South-West Protectorate.

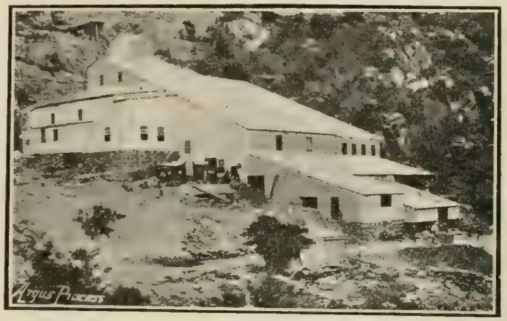
The Weynek tribute is likely to end, owing to the low price of tin. The amount of royalty paid in 1920 was £600. Work is still being continued on the Olifants tin mine, presumably with success, or it also would have yielded to the untoward causes now prevailing. The high price of the metal which ruled at the opening of 1920 led to the reworking of the Witfontein tin mine in the Waterberg district. At first, promising indications were met with, but the ore body subsequently gave out, and operations were discontinued. A quantity of ore from the dumps was transported to Groenfontein and there treated—the proceeds meeting all expenses incurred. At Welgelegen, a promising tin prospect has been located, and further development has been arranged for.

"T.C.L." Tin.

A brief review of the tin interests of the "T.C.L." was included in the recent annual speech of the Chairman of that Company. He said:—The 1920 profit from the Groenfontein tin mine was £5,000 less than in the preceding year, and, as regards Mutue Fides, in place of the preceding year's profit of over £3,000, we realised a loss of £1,263, so have closed down that property. The picture for the current financial year promises to be even more disappointing because, owing to the low price of tin, we have had to close down milling at Groenfontein and will suffer further reductions in revenue through the effect upon certain of our tributes of the same economic factor. However, this setback may prove to be a blessing in disguise since it gives our consulting engineer an opportunity of making a systematic investigation of the possibilities of our unexplored mineral areas which in the aggregate comprise some three and a half million acres. Mention of the consulting engineer reminds me that, as a temporary measure, the company has fortunately been able to secure the services, in this capacity, of Mr. Alan Stuart, who for many years successfully managed our Groenfontein property; and in the investigation to which I have just referred, Mr. Stuart is associated with Dr. E. T. Mellor, consulting geologist to the Central Mining and Investment Corporation. I am hopeful that the joint efforts of these gentlemen will be very much to the benefit of the T.C.L. With regard to the tin prospecting operations specified in the annual report, the work at Witfontein has been discontinued owing to unsatisfactory results; and, more recently, Allemansdrift has similarly gone out of commission. There remains only Welgelegen, where we are continuing active prospecting operations in view of the encouraging results so far obtained.

The Market Outlook.

The market outlook for the metal is best described in the following extracts from recent authoritative reports:—Messrs. Rudolph Wolff and Co. write:—From our correspondents in Ipoh, Malaya, we have the following information:—"The approximate amount of tin which the Federated Malay States Government has in stock is 10,000 tons, and it will be sold at a loss. The effect of the present very low price will be the closing down of all Chinese mines, which cannot produce at the present market price. This will undoubtedly have a tendency to reduce stocks. Prices are now so low that some of the best-equipped mines are making very small profits on sales, and we estimate that production will drop by as much as 50 per cent. unless there is a recovery in the near future. At the present time most of the dredging companies are carrying out much-needed repairs, although even these are curtailed as much as possible owing to the reluctance to spend money."



A View on a Transvaal Tin Mine.

The Tin Position in the U.S.A.

Our American correspondents, whom we consider reliable, write us by last mail that:—"Every consumer of tin in this country is heavily stocked and has practically no orders on his books." We can quite understand that the makers of containers are short of orders, but are surprised at the remark regarding the stocks of tin held. It is, however, an undoubted fact that during the last six months the U.S.A., which are far and away the largest consumers of tin, have managed to get along without purchasing tin of any kind in this country, and have even gone so far as to ship tin smelted in the U.S.A. We have been informed and we believe the information to be correct, that Bolivia has become almost a negligible quantity in the supply of tin, and as it is from these ores that the tin is produced in the U.S.A., we anticipate seeing a considerable falling-off in this direction.

Chance for a "Corner."

"However, the whole situation resolves itself into one of money. If there were any person, syndicate or corporation who could, at the present time, put up the necessary funds to acquire the world's control of tin, we feel sure (says Messrs. Rudolf Wolff) that they would have a very remunerative operation. In the meantime, there are undoubtedly stocks sufficient for us to trade upon, and prices may even now (although below the cost of production) sag several pounds. The 'call' option may be obtained for £11 per ton at the present moment, and we should strongly recommend our friends to watch this owing to the great possibilities of the market. The "carry" of tin for three months costs £3 15s. to £4. The premium on Straits tin is £8 per ton, on Banca tin £15 per ton, and Billiton £8 per ton. The 'double' option could be purchased at £22 per ton. While we are not in the habit of giving tips in our reviews, we do honestly think the investment of £11 per ton in the 'call' of tin at round about £165 per ton offers very great chances of profit with very little possibility of loss."

The Banking Position.

The quarterly statements of the Banks as at the 31st March last provide further evidence of the reaction in trade which South Africa is experiencing in common with other countries. The trade boom reached its zenith in the early months of 1920, since when the quarterly statements published by the Banks reveal a steady decline in deposits, as shown in the following table:—

Date.	Total Deposits.
31st March, 1920	£117,311,183
30th June, 1920	110,159,379
30th September, 1920	104,452,391
31st December, 1920	102,331,940
31st March, 1921	99,570,923

Concurrently with the decline in deposits there has been steady and continuous demand for facilities. The break in overseas market prices and the reluctance of exporters to sell at the reduced quotations resulted in accumulation of produce in South Africa, with consequent lock-up of capital and restricted spending power. At the same time imports of high-priced goods, ordered some time previously, came forward freely and could not readily be disposed of. Forced realisations of merchandise, in some instances at less than cost, reacted again on local manufacturers, and all these factors are reflected in the Banks' advances, which show the following totals:—

Date.	Total Advances.	Percentage of Deposits.
31st March, 1920	£87,634,741	75
10th June, 1920	89,698,887	81
30th September, 1920 ...	94,399,028	90
31st December, 1920 ...	91,138,022	89
31st March, 1921	86,355,100	87

Whilst deposits have declined during the twelve months by £17,740,260, or 15 per cent., advances have been reduced by £1,279,641 only, and these figures show the support afforded by the Banks during the difficult period of deflation and monetary stringency. Bank notes in circulation, which amounted at 31st March last to £9,261,078, show practically no change during the year.

Springs Mines.

The following cable has been despatched to the London office for publication:—

> "In view of the present strength of the ore reserve position of the mine relative to the crushing capacity and also the possible further increase in the ore reserve as at the 30th June next, the Directors have authorised the purchase of additional equipment to increase the nominal crushing capacity of the plant from 40,000 to 50,000 tons monthly to deal with such increased tonnage as may be available from the mine."

INDUSTRIAL DEVELOPMENT NEAR LOURENCO MARQUES.

Progress of Mozambique Portland Cement Company's Works.

On visiting the site of the new cement works at Matolla, now making very rapid progress, one finds abundant indication that the place will, in a very short period, be converted into one of the most active and flourishing industrial centres of the Province.

A railway siding just over a mile long, specially built to serve the company's constructional requirements, is now being made the most of; the continual running of trains to the locality heavily laden with machinery and other material, great heaps of sand and stone, enormous quantities of cement, excavations, cranes, new buildings, and heavy machinery, all lend the place a very business-like appearance, giving one cause to believe that the company is fully in earnest and that the scheme will not be paralysed half-way in a theoretical stage, and that good, high-grade cement will soon be available.

The greater part of the machinery is already in hand, and the remainder is expected to arrive within the next fortnight, when the foundations for both these and the factory building, which is of gigantic dimensions, will be ready for erection; the chimney-stack itself will be five metres in diameter and 50 in height.

The ground has been cleared and brick offices have been erected, first consideration having been given to making the staff comfortable and practically protected from fever. Commodious and hygienic quarters for the men (providing accommodation for 24 Europeans), dining room, kitchen, baths, etc., have been erected. This building is 110 feet long and 50 wide, having a 9-foot mosquito-proof verandah all round.

The company's works are under the able superintendence of Mr. Herman Struckel, who built the magnificent cold storage works also at Matolla and which belong to the Smithfield Company. We hope to be able shortly to comment on the activity as regards the actual production of cement, which will doubtless greatly help to solve the local housing problem.—Vide "Lourenco Marques Guardian," 11th June, 1921.

Gold Mines Investment.

A circular to the shareholders of the Gold Mines Investment Company recalls that last year's prolt was mainly used in writing off depreciation, of which a considerable amount stil lremains. At the annual meeting on December 9th, 1920, the directors were asked to devise some scheme to put the Company on a dividend-paying basis, or failing that to liquidate. The Company has an issued capital of £500,000 in 500,000 shares of £1 each, and holds assets which are valued at date, after allowing for liabilities, ate £454,000, with an estimated income from investments based on the current year of over £25,000 after paying expenses. The directors propose that the assets of the present company be transferred to a new company with a capital of £250,000 in 500,000 shares of 10s. each, one new share fully paid being issued in exchange for one share fully paid in the present company. The advantage to be derived from the adoption of thi scourse is that the new company having no depreciation on tis investments would be in a position to pay dividends from profits profits derived from the income received from investments, from any profits made in the ordinary course of business, and from any sales of investments which would be standing in the books of the new company at figures considerably below the low range of values no wcurrent.

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The Half Years' Dividends in Detail.

INFLUENCE OF REDUCED GOLD PREMIUM—FAR EAST RAND CONTRIBUTIONS.

The following are the gold mining dividends declared up to the time of going to press, for the half-year ending June 30, 1921, compared with the declarations for the corresponding period of 1920:—

Witwatersrand Gold Mines.

	Date.	Rate per cent.
Brakpan Mines	June, 1920	15
	June, 1921	15
City Deep	June, 1920	12½
	June, 1921	20
Consolidated Langlaagte ...	June, 1920	5
	June, 1921	5
Consolidated Main Reef ...	June, 1920	6¼
	June, 1921	3¾
Crown Mines	June, 1920	27½
	June, 1921	10
Ferreira Deep	Mar., 1920	10
	Mar., 1921	10
Geldenhuis Deep	June, 1920	2½
	June, 1921	7½
Government G.M. Areas ..	June, 1920	20
	June, 1921	25
Geduld Proprietary	June, 1920	7½
	June, 1921	7½
Langlaagte Estate	June, 1920	2½
	June, 1921	5
Meyer and Charlton	June, 1920	50
	June, 1921	50
Modder B.	June, 1920	32½
	June, 1921	40
Modder Deep	June, 1920	60
	June, 1921	65
New Modderfontein	June, 1920	45
	June, 1921	42½
New Primrose	June, 1921	5
New Unified	June, 1920	5
	June, 1921	5
Nourse Mines	June, 1920	3¾
	June, 1921	2½
Robinson	June, 1920	5
	June, 1921	1
Rose Deep	June, 1920	10
	June, 1921	7½
Springs Mines	June, 1920	5
	June, 1921	7½
Van Ryn	June, 1920	7½
	June, 1921	7½
Van Ryn Deep	June, 1920	25
	June, 1921	30
Village Deep	June, 1920	2½
	June, 1921	3¾
Witwatersrand	June, 1920	5
	June, 1921	10
Wolhuter	April, 1920	6¼
	April, 1921	1½
Sub-Nigels	June, 1920	5
	June, 1921	3¾

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Miscellaneous Dividends.

	%		Per Share s.	d.
De Beers	—		10	0
Pretoria Portland Cement	12½	or	2	6
Apex Mines	5	or	0	6
Natal Navigation	5	or	1	0
	5% bonus.			
Swazi Tin	7½	or	1	6
Rand Selection Corporation	15	or	3	0
Rand Mines	35	or	1	9
Enyati Colliery	10	or	20	0
Buffalo Colliery	20	or	40	0
Johannesburg Estate Co., Ltd.	2½		—	
Johannesburg Consolidated Invest. ...	10	or	—	

CONSOLIDATED GOLD FIELDS: LAST MONTH'S RESULTS.

Company.	Stamps. Running.	Tube Mills.	Tons Crushed.	Gold declared. Fine ozs.	Profit.
Simmer and Jack ...	320	7	60,000	14,617	£12,043
Robinson Deep	150	9	59,000	18,148	16,264
Sub Nigel	30	2	9,000	5,915	6,548
Totals	500	18	128,000	38,680	£34,855

Gold in reserve: Simmer and Jack, 1,200 ozs.; Sub Nigel, 2,330 ozs.; total, 3,530 ozs.

The revenue derived from gold for the month of May is calculated at the rate of £5 3s. 9d. per fine oz., less estimated gold realisation and exchange charges of 1s. 6d., or a net figure of £5 2s. 3d. per fine oz.

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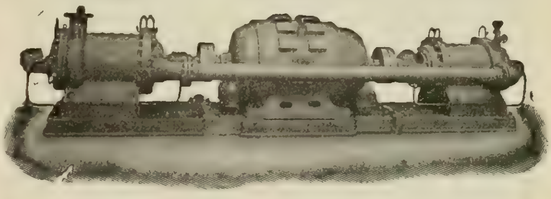

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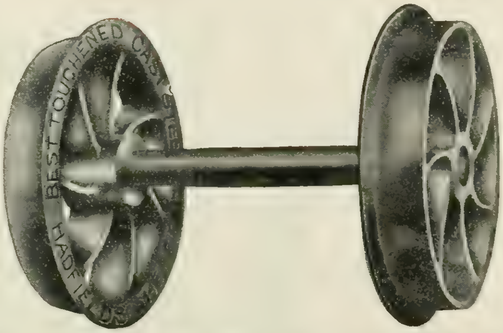

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Central Banking and South Africa.

SIR HENRY STRAKOSCH EXPLAINS AND DEFENDS THE PRINCIPLES OF THE SYSTEM.

At the request of the London "Times," Sir Henry Strakosch has written a detailed description of the principles of central banking as applied to South Africa. "This statement of principles," says the "Times," "recently received the endorsement of prominent bankers and financial experts." We have omitted from the article passages dealing with the linking up of the credit system of the Empire by means of an Empire Bank. That proposal, as Sir Henry Strakosch shows, is not practical politics.

Credit is a vital element in all healthy economic life. The literal meaning of credit is trust or confidence, and confidence in a financial and monetary system rests upon the belief in the strength, stability, and efficiency of financial institutions. With the present system of immense deposits payable on demand, it is of vital importance to every country that its financial system should be established on lines which will command confidence in all circumstances and conditions.

What system has history proved to approach most closely that ideal?

The essence of banking has been pithily explained by an eminent banker as follows:—"If banks were to keep in cash all the money deposited with them, business would come to a standstill and a crisis would ensue. If, on the other hand, banks were to lend all the money on deposit with them, a general panic and collapse would follow after a short period of over-stimulation. Between these extremes lies the middle course, the finding of which is the problem of banking."

There is no mathematical rule for determining the correct proportion between reserve and demand obligations. In each country that depends on its economic and political conditions, and in a special degree upon its financial system. This general principle, however, may be safely laid down—namely, that only that system is safe which enables the banks, when necessary, to turn into cash a maximum of their assets with a minimum of disturbance to general conditions.

American Upheaval of 1907.

During the last half century prior to the war a system of central banking was built up in all the chief countries of Europe, while the U.S.A. adhered to a system of decentralised banking reserves. While the European countries remained free from grave crises and general suspension, America was subject to frequently recurring violent crises, culminating in 1907 in a financial upheaval of unparalleled extent. The country escaped by the narrowest margin from general suspension and a total collapse of credit. The effect of the collapse on production is perhaps best illustrated by comparing the pig iron production of the U.S.A. in 1907 of 25,000,000 tons with that of 1908 of 15,000,000 tons—a reduction of 40 per cent.

Europe has had, during the same half-century, periods of over-trading and over-speculation, which led to crises, but, when they occurred, the evil was confined to those who had violated the laws of sound business and to their financial associates. At no time has there been a disastrous panic or general suspension. The business of the country—apart from that of the sinners—went on as usual.

Let us consider the main features of the two systems—first, the American system of decentralised banking reserves as it existed until the Federal Reserve system was introduced in 1914, and the European system of centralised reserves.

The system which obtained in South Africa before the establishment of the South African Reserve Bank, and obtains to-day in Australia, Canada, and New Zealand, though widely differing in many details from the American system prior to the establishment of the Federal Reserve system, is very similar in its fundamental lines. Under that system each bank holds its own reserves. Their cash is the only asset which in a crisis can be depended upon as reserve.

Defects of Decentralized Reserves.

The deposits are invested as a rule in loans by way of overdrafts, and to a minor extent in the purchase of bills, while short-term loans are given to the Stock Exchange. When the need for contraction comes, and the banks feel the necessity for strengthening their reserves, they have to call in their overdrafts just at a time when merchants and manufacturers and the Stock Exchange, owing to brisk trade, can least afford to repay them. They can probably only do so by transferring the overdrafts to a competitor of the bank. That leads to the most objectionable feature of the decentralised system—viz., that the strengthening of one bank's reserve can only be accomplished at the expense of another bank. Practice has sufficiently demonstrated that, in times of a threatened crisis, overdrafts cannot to any appreciable extent be turned into liquid assets, and therefore cannot be relied upon as a reserve in a crisis. The ruthless calling in of such loans only precipitates it. The same applies to Stock Exchange loans. Such loans lead in times of slack trade to an undue over-stimulation of Stock Exchange speculation, while their withdrawal in times of active trade tends to precipitate the crisis and to cause an unduly heavy destruction of values.

Sir Henry Strakosch, author of this instructive article.

As for the holding of commercial paper, that, without a discount market—and a discount market cannot exist without a central bank—becomes a lock-up till maturity.

The pernicious effect of the strengthening of reserves by one bank at the expense of its neighbour was brought clearly to light in South Africa last year. In the short space of a month one bank lost £1,300,000 of specie, while its competitor gained £1,000,000. The total specie reserves of the two banks was £5,000,000, and the loss of £1,300,000 meant a reduction of that bank's metallic reserve of no less than 50 per cent. Within about a month of this taking place the position was reversed.

When one or the other of the banks found their reserves dwindling, and experienced difficulty in turning their assets into cash, they naturally curtailed their business. This position resulted, for a time, in an absolute refusal in the case of one of the banks, and in a serious curtailment by the other, of the most legitimate business of a bank—viz., the financing of marketable produce in transit to the market.

Naturally there was exasperation amongst the whole community. The clamour for legislative action compelling the banks to keep what are described as " adequate reserves " can be appreciated. In similar circumstances the United States Government years ago compelled the national banks to hold at least 25 per cent. reserves against their demand liabilities, and the same idea was suggested in South Africa from more than one quarter.

Minimum Reserve Fallacy.

How very absurd, and how very dangerous, is such legislation is not realised. A reserve is created for emergencies, but it ceases to be a reserve if the law forbids its use when the emergency arises. In other words, a minimum reserve is no reserve at all. When the legal minimum is reached, the banks have to suspend business. Such suspension of credit, when most needed, makes ruin inevitable, and leads to another pernicious feature of the system—viz., the hoarding of cash.

The system has been appropriately likened to a system of fire protection by buckets. It is equivalent to compelling by law each householder to use only his own bucket to suppress a fire in his house, and restricting its use to 75 per cent of its contents, the remaining 25 per cent. being a reserve upon which he must not draw. If three-quarters of a bucket is insufficient to extinguish the fire in his house, it spreads, with the consequence that the whole village succumbs to the conflagration. Fortunately, we are wiser in our system of fire protection. We concentrate our water in one reservoir, and use it without limit to extinguish the fire, wherever it occurs, and save the village. We ought to apply the same principle to banking reserves.

It is truly remarkable—and the best testimony to the dogged energy of America—to note that that country, with so inadequate and so inelastic a credit system, was able to survive its prosperity; for the finer its harvest and the greater its progress the nearer was the country brought to a disastrous crisis.

Centralized Reserve System.

We now come to the fundamental features of the central banking or central reserve system. That system has discounts for its basis. The two are inseparable.

The central banks are not in any general sense competitors of the commercial banks—or joint stock banks, as they are called here—for they keep aloof from the ordinary everyday commercial banking business in normal times. They hold the reserves of the commercial banks, and only intervene in times of stress. They then extend credit liberally, mainly by way of rediscounting bankable bills to all whose solvency and condition entitles them to receive it. The success of the system is based upon the policy of using reserves promptly and fully when an emergency arises. The knowledge that, whatever the circumstances, bankable bills can be turned into cash leads to the development of a discount market, for no one hesitates to buy such bills. The banks' most legitimate asset—viz., a short-term advance against goods in the form of a commercial bill, becomes their quickest asset. When an emergency arises they know that by rediscounting with the central bank they can mobilise their holding of bills, which may thus be regarded as a secondary reserve.

Take the position of the Joint Stock Banks in pre-war days. Their first line of reserve consisted of, say, 3 to 4 per cent. of till money, and about 15 per cent. of deposit on current account at the Bank of England. In addition, they had, as secondary reserves, money at call and short notice (which are loans against short bills), about 15 to 20 per cent., and finally large holdings of bankable bills. They were thus easily able to mobilise without unduly disturbing the general conditions some 55 per cent. to 65 per cent. of their current liabilities.

Mobility of Assets.

It is unnecessary to emphasise that it is this greater mobility of bank assets which makes the Central Banking System so infinitely more safe and efficient than the system of decentralised reserves. The strengthening of one bank's reserves does not necessarily mean a weakening of the reserves of others, and there is no danger of withdrawals of cash for purposes of hoarding, which so frequently occurred in America and helped to precipitate the crisis.

To enable a Central Bank to fulfil its functions, it must have the sole right of note issue. It is not necessary now to go into the niceties of this question, but it is well to remember that every one of the Central banking systems of the Continent and also the Federal Reserve system provide in one form or another, apart from a percentage of gold, for the creation of currency on a backing of bankable bills. It is fairly generally recognised that this basis is a sound one. It gives elasticity based on the changing demand of trade. It means expansion and contraction in accordance with the volume of trade of the country.

The system in this country is not essentially different from the Continental systems, for the currency of this country in pre-war days was not the Bank of England note but the cheque, and the cheque on a Joint Stock Bank rests on that bank's credit balance at the Bank of England, which in turn rests on its reserves, a large part of which was in the form of discounts.

There can hardly be any divergence of view as to the infinite superiority of the Central Banking System. It probably approaches nearest the ideal of enabling confidence to be maintained in all circumstances. Though it would require a close study of local conditions to decide what particular central banking system is best fitted to meet the needs of individual parts of the Empire, it may safely and definitely be affirmed that it is highly desirable that the system should be introduced in all those parts of the Empire which have not already established it.

But they must be genuine Central Banks. They must not be commercial banks masquerading as central banks. They are capable of doing more harm than good.

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The Reduction of Mine Wages.

MEN'S UNIONS' PLAUSIBLE CASE—THE CHAMBER TWITTED—NECESSITY FOR IMPROVED EFFICIENCY DISREGARDED.

As has been shown in the last two issues of this Journal, the Chamber of Mines has sought to reduce wages on the mines at a particularly ill-chosen moment having regard to the fact that the case for a reduction presented a week or two ago by the President was viewed mainly from the fact that the price of gold was declining. Since that utterance was delivered the tendency has been upward, as it was clearly predicted it would be in our issue of April 9th.

The Chamber lost its chance in February, and although we have little sympathy with Trades Union policies as they are ordered on the Rand, and although we have for months past clamoured for economy and efficiency on the Rand, we cannot help but admitting that on this occasion we have a much greater admiration for the men's reply than we have for the inconsistent arguments and dilatory methods employed by the Executive of the employers.

It must be said that the men's representatives have made the best of their case in their reply to the Chamber of Mines in regard to wage reduction. The reply is published in the form of "A Report of the Joint Executives in the Department of Mining, S.A. Industrial Federation," submitted on Monday to the Chamber of Mines. It has been given considerable prominence in the daily Press, and we do not propose to do more than summarise it here. The report begins by twitting the Chamber on changing its ground from "cost of living" basis of discussion to "two main grounds" with "two minor reasons in support of its case," a matter which already has been referred to in the columns of this journal. We should have thought that any reasons for a reduction in wages that the Chamber might be able to bring forward could hardly be ruled out of the discussion. At any rate, after registering its protest the report goes on to examine the Chamber's reasons in detail. These are: (1) That the drop in the price of gold from 127s. 6d. per fine ounce to 103s. per fine ounce means a decline in revenue to the mines of £10,000,000 per annum. (2) That there are 21 mines called "low grade mines" which are in a precarious condition, and unless costs can be reduced there is every likelihood of these mines closing down.

The Chamber mentions two minor points which may be taken as arguments in support of the claim. These are:—(1) That since the commencement of this year the cost of living has been dropping. (2) The tendency throughout the world is that wages are coming down.

In considering the points put forward by the Chamber of Mines the executives have taken them in reverse order to that of the Chamber of Mines, and has considered: (1) The downward tendency of wages in other parts of the world. (2) The decrease in the cost of living. (3) The low grade mines. (4) The drop in the price of gold.

We need not follow the "executives" into their arguments under each of these heads. Briefly stated, they refuse to admit that No. 1 affects the issue at all; they deny the decrease in the cost of living, disclaim responsibility for the plight of the poorer mines, and—here they are on surer ground—point to the recovery in the gold premium. The Executive's own summary of its arguments may be put on record. They claim:

(a) Downward Tendency of Wages.—That the downward tendency of wages overseas is no criterion, and does not justify a reduction of wages on the gold mines.

(b) Cost of Living.—That as the figures upon which cost of living allowance has all along been based have proved to be wrong, and the employees have never received the amount that they were entitled to, the present drop in prices does not affect the position and gives no justification for a reduction in wages.

(c) Low Grade Mines. — As no real attempt has been made to deal effectively with the problem of the low grade mines, and further as the trade unions do not admit the right of employers to adjust wages on a basis of the poorest paying part of their industry leaving it open to them to manipulate the industry for the purpose of keeping wages at the lowest level, there is no justification for this reduction.

European and Native Miners on the Rand.

(d) The Drop in the Price of Gold.—The trade unions do not agree that wages should be adjusted on the basis of the price of the commodity alone. During the time the proposal of the Chamber for a reduction of wages has been under consideration there has been a comparatively steady increase in the price of gold, and in view of the fact that the Chamber disavowed any intention of reducing wages except to relieve a critical position in the industry, which the increased price of gold has already done, and which competent authorities inform us may reasonably be expected to continue until the end of the year, the executives anticipate that the Chamber will now withdraw its proposal for a reduction.

A Conference Suggested.

After this brave piece of special pleading the report concludes by stating that the executives are of opinion that during the non-critical period now in existence through the increase in the price of gold the whole question of wages should be reviewed nationally by means of a meeting of the national conference of employees and employers. "This the executives request your Federation to press for with the Government at the earliest possible date."

The Combined Executives have appointed a negotiating body who are instructed (if the Chamber does not donsider this reply a cogent and conclusive mass of reasons for the withdrawal of the request for a reduction of wages), if the Chamber desires it, to meet representatives of the Chamber in conference again on this subject.

Mines and Railways and Workers.

A CRITICAL EXAMINATION OF OUR PRESENT INDUSTRIAL AND FINANCIAL POSITION.

Sir,—On all sides the slogan is "something must be done." Your paper offers a prize for efficiency and the Chamber of Mines notify a reduction in wages. One cannot attempt to grapple with the mining costs by themselves, as the railways play an all-important part in our daily lives, and there is no question but that the railways and harbours are not carrying their side of the burden.

The Mines.

To talk of the mines being finished is foolish talk. Sir Lionel Philips not so many years ago made the classical speech about "Mining 100 years hence," and a few weeks ago he talks of only a few mines between Apex and Randfontein being at work in five years' time and grass growing in the streets of Johannesburg. Both statements are probably correct. The fault I find with them is that they are contorted and trotted out at convenient or inconvenient times and adapted to the purpose required at the moment.

Mines will be shut down unless conditions change, that is all. Mines can still be working "100 years hence" if conditions are adapted to make them pay. The question is: Will it pay the ruling powers better to-day to see half of the older mines shut down and lots of labour available to work the remainder or not? In other words, is the monetary stake they hold in these old mines in the form of shares and pickings from administration greater than the possible gain from a swing of the stock market? The administration and power to shut down or work rests with a very few people in certain houses. The law does not compel them to show what interest they hold in the mines and the articles of association only specify for the holding of an infinitesmal number of shares to qualify a man or a few men to order the destinies of many a mine on this field.

As for the mines being exhausted, they are only exhausted so far as developed pay ore of a grade to be worked at present-day costs is concerned. The Main Reef itself and many another unnamed body of ore are all practically intact. That is reef in the existing mines. In reefs outside the Main Reef there are millions and millions of tons of ore lying practically on the surface and assaying just under pay values at to-day's costs.

In the Alaska Treadwell 2 dwts. ore would be rich. Some of these "Kimberley" reefs are large bodies and there are no reasons why under certain conditions even 2 dwts. ore should not yield a profit. Can this be attained? Can conditions be made in this country so that ore approaching the grade of, say, 2 or 2½ dwts. extraction can be made to yield profits? I think they can, but it will require all shoulders to the wheel.

There must be more brains and care put into the management and a little originality shown to meet individual cases. Coming to the office at 9 a.m. and leaving at 4.30 propmt is not all that is necessary for the privilege of drawing thousands a year. There is too much slavishly "carry out instructions and take no responsibility style" about most mine management. Too much care to do nothing to jeopardise their fat billets and a great deal too much of a rush and bustle style and too little serious thought. This last is evidenced in the recent speech of Sir H. Ross Skinner at the annual meeting of the Rand Mines. In it is stated: "Investigations in conjunction with the Central Mining and Investment Corporation, Ltd., for the acquisition of coal mining interests have progressed satisfactorily. Up to the present 270 separate farms in the Transvaal and Natal have been inspected. As a result an area of 8,500 acres on the farm Woevekrans has been acquired."

An average farm in South Africa may be taken as being 5,000 acres in extent, and these brainy, busy engineers have examined two hundred and seventy of them besides presumably looking after the other mining interests. Wonderful men, those engineers!

Possibly over 2,000 square miles of ground in coal districts have been examined and all this mountain of labour has produced this 8,500 acre mouse! Not a solitary bit of coal good enough to satisfy those critical experts could be found in the whole of Natal!

The Men's Position.

When we come to the question of what can be done to reduce costs in relation to the men who earn wages instead of salaries, there is great trouble looming. Trades unions are entrenched, and those in work are selfishly holding on to all they've got. It is not only the mines. It is in every branch of labour. The fundamental point of what an industry can pay does not appeal to them. It is the earth and all it contains to them. I would ask them to consider: If all the mines—diamond, gold, coal and base metal—were shut down or non-existent, were this country in the same position of, say, Argentine or even New Zealand, with only a few gold and coal mines, what would be the highest average wage the country could afford to pay and produce articles or goods to sell in competition in the world's markets? That is the root of the whole question. In New Zealand, before the War, with the most progressive democratic government in the world and a far more fertile country producing natural products than the average of this country, the average wage earned would not be near 10s. per day. If this is correct, the average this country can afford, even allowing for cheap native labour, cannot be much over 12s. 6d. to 15s. per day. This is borne out if we examine the average wage earned in Natal and the Cape before the Rand assumed big dimensions.

Every shilling paid over and above what would be paid if there were no mines is just a "premium" on "mining." It is pure and simple blackmail on those who have the courage to risk their "savings" (which is so often referred to as capital) in the speculative investment of gold mining. The working man likes to have his 10s. or £5 on a horse, or even in a Delagoa sweep, on the off-chance of making a bit. But when the other fellow puts his thousands and millions in gold or coal mines in the expectation of picking a winner, he, the worker, forgets all about the "also rans," the Van Dyks, the Rand Collieries, the Cinderella Deeps, the Angelo Deeps and the hundreds of other failures, and only measures the mining industry by the Ferreiras, Meyer and Charltons, Modders, and Van Ryns. I am afraid, whether it is palatable or not, the working man has to make up his mind to accept a much lower scale of wages. Cost of living (big sounding phrase) will come down, but it won't come first. The shops will never reduce prices whilst the same high wages are being handed out ungrudgingly every week, and the working man or his wife has the spending of them. One only needs to watch the crowds and what they buy on a Saturday to understand this.

Cost of living means nothing. A native can live for threepence per day and a white man for less than sixpence, when away from the towns. Is that the cost of living? Messrs. Crawford and Co. will call it "existence." Messrs. Sir L. Philips, Solly Joel and Co. will no doubt tell you they could not "exist" on £10,000 a year. Farm workers are leaving the farms for the increased pay of 7s. 6d. for married men on the roads, so they find that the average and steady wage on the land is less than 7s. 6d. per day.

It's a sort of inhuman way to put it, but the cost of living or existence counts for little in industry. Articles must be produced for less than people are willing to pay for them, or sooner or later there will be no work at all. The farmers were not asked about their cost of living when wool dropped from 4s. to 8d. and mealies from 30s. to 10s. With our gold industry we are in an even more tight position. So long as gold is currency itself, a gold premium is only a fallacy. Throughout its life a gold mine has never anything to sell, and when it finally closes down only some old scrap plant to dispose of. During its life it distributes part of its product to its employees in the form of sovereigns in wages, and part in payment of stores and Government taxes, etc., and if there is any left it hands it over to the shareholders as dividends. To say we send it to (say) America and get 20 dollars for one ounce, which in turn is converted into British paper pounds at a discount only means that in turn we have to part with so many more paper pounds again when we buy American motor-cars or packets of chewing gum.

At the Rand Mines meeting Sir H. Ross Skinner gives the increase in costs of 1920 over 1915 as:—

	s.	d.
White wages	3	9
Native wages	0	7½
Stores	2	9
Head Office	1	0
	8	1½

Apart from the item stores, all the increase is wages and salaries. The item stores, to be of any use for analysis, should have been subdivided.

Coal or power and lime, for instance, bulk largely in this item, and wages again at the collieries and lime works are responsible for the most of this increase. To be plain, there is no use disguising the fact that wages and salaries are entirely responsible for the present condition. Lessened efficiency, of course, classes as increased wages cost.

"Cost of living" is not likely to come down much as long as the stores get possession of the workers' big cheques each Saturday. This has been amply proved at Home recently. Retailers could not possibly sell butter at less than 4s. per lb. and sugar at about 1s. till the miners' strike came on. But it only required a few weeks' strike to prove that butter could come down to 2s., and other things just as much. In Cuba they now suddenly find there are a million and a half tons of sugar available and no demand for it.

There is no question but that the retailer is to blame to a very great extent for the high cost of most commodities in this country. Major Trevor states, and he has no doubt gone very carefully into figures, that there are only 300,000 actual producers of commodities in the whole Union. To quote him, he says: "Thus for every hundred audult males producing wealth there are forty-five adult males producing nothing, and for every hundred males in the country there are seventeen shopkeepers, or one shopkeeper for every 5.7 males."

A proportion of these non-producers is necessary, such as doctors and retail distributors, but there is no question but what the bulk of them are pure parasites on industry. These blood-suckers cannot be eradicated, because the worker, having so much spare cash included in his cost of living, he leaves so much room for these excrecences to batten on the margin of excess he ladles out. In older countries in the past it has been amply proven that low wages and unemployment soon brought down costs of the necessaries of life. It would seem that nothing else will do it here.

With all our vaunted brains, can no one here produce a system to give the hard worker, the producer, better value for his earnings than the old, cruel way of partial starvation before prices are allowed to fall? Can the worker not be induced to say I will only spend half my earnings till you shopkeepers find a way of giving me my requirements at a trading margin of, say, 25 per cent. to 50 per cent. over its cost of production. Even our costs of production are all too high here. In this year of grace 1921, so far as can be seen, there are, outside our mineral wealth, only two articles are ostrich feathers and mohair, and these, too, are in the world's markets without their being in one way or other indebited to or subsidised by mining industry. These articles are ostrich feathers and mohair. All these are in one way or another bound up with the prosperity of the mining industry.

How the Railways Affect Costs.

When one examines the railway position and its incidence on mining costs, you at once come back to the old root cause. Too little done for the money spent and too much on the unproductive side. The system is, too, bound up in red tape. A man who only sees three or four trams per shift has to go off work at the end of eight hours, and another takes his place, or else be paid overtime to perhaps wait an hour or two to see another tram pass through. It's all so silly if it was not the awful tragedy we stand on the brink of. A case of cyanide can be brought from Europe to our ports for 8s. or so, but it takes double that amount to bring it from the port to the mines. It's no use in this article in labouring the iniquities of the railways, but one item which directly affects mining costs may be cited, and that is coal transport:—

	s.	d.
Glencoe to Durban (243 miles)	11	4
Hlobane to Durban (309 miles)	12	1
Witbank to Bloemfontein (334 miles)	13	0
Witbank to Johannesburg (83 miles)	7	0

Here we have coal carried past Germiston to Bloemfontein more than *four times* the distance for an extra 6s. per ton, and over the difficult Natal line it is carried three times the distance for an extra 4s. 4d.

Here we have the largest coal producing centre delivering coal to the largest individual market in the Union. The coal is brought in the largest train loads in operation on any section of the railways, and the line is one of the very best adapted for economical handling of traffic, and yet the rate charged is more than double any other rate we can find.

The above rates are given with the usual disclaimers as to accuracy. They were correct as at the date of issue, but at time of going to press we have not heard what the latest alterations are.

Then there is the public debt of £180,000,000, two-thirds of which has been incurred in railway and harbour construction. To talk of it being mostly reproductive is only fooling ourselves with dangerous illusions. They are only reproductive so long as the mines are prosperous and going strong. It is no exaggeration to state that 75 per cent. of the whole earnings of the railways are directly or indirectly traceable to the mines.

The tragedy of the situation is that these lines are all built on credit, on the belief of the long life of the mines. No attempt is being made to reduce this indebtedness. They do not even earn their keep. Do our financial experts recognise that the whole of the interest on that huge sum has to be won from the producers. That the 300,000 workers have to find the needful. In round figures this means that every week the first 7s. 6d. worth of goods produced by workers is appropriated to pay for those debts.

We have a great asset in the Government share in the East Rand leases. The share from "Areas" last year came to £800,000. This is capital, it is not earnings, and it is used to pay wages and salaries for the running of the country.

What will happen to the country if the mining industry goes down and this huge debt is left to the agricultural workers to father? What would happen to the Budget if those mines on the East Rand went on strike for six months, or if the Chamber of Mines decided to curtail operations till something like fairplay in the matter of taxation was meted out. There would be nothing illegal or even unjust in Modders, Areas, etc., reducing their monthly tonnage from 50,000 to 10,000, and where would that leave the country?

I am, yours, etc.,

A.D.

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Modder East Development.

GOVERNMENT INSPECTOR'S REPORT.

In the course of his report for the quarter ended March 31, the Inspector of Mining Leases writes:—

Compared with the previous quarter, there has been an increase of 585 feet in the total footage developed. The payable percentage of the footage sampled decreased from 58.4 per cent. to 51.8 per cent., and the average value from 445 inch pennyweights to 379 inch pennyweights. The percentage of payability in the Nos. 1 and 2 shaft sections has fallen off, whilst that in the Nos. 3 shaft section has improved.

The rock broken in the mine, according to survey measurements, amounted to 80,167 tons. The rock broken came from the following sources:—

	Tons.	Percentage.	Sampled value. Dwt.
Payable ore reserves ...	51,667	64.4	12.56
Development	28,500	35.6	2.75
Totals ...	80,167	100.0	9.08

	Inches.
Average stope width	62
Average reef channel width	38

Compared with the previous quarter there has been an increase of 15.166 tons in the tonnage mined and a decrease in the average value of 2.57 dwt.

The average value and width of ore mined from the payable reserves, according to data adopted in the estimation of reserves as at 30th June, 1920, were 9.81 dwt. over 57.83 inches, whilst the payable reserves as a whole at that date averaged 7.75 dwt. over 55.3 inches. Overmining has therefore taken place to the extent of 138 inch pennyweights.

The average face sampling value of the ore stoped still continues considerably higher than the estimated average value of the corresponding blocks, the difference amounting to 215 inch pennyweights. For the previous quarter this difference was 382 inch pennyweights. It is to be expected that as the blocks are opened up this difference will be a decreasing one.

The average reef channel width shows a decrease of about 2 inches, whilst the stope width has increased 5 inches, making an increase in the external waste carried of 7 inches compared with the previous quarter.

Although the stoping width is a few inches in excess of that estimated to be carried, it is in no way excessive, and the waste is largely utilised and required for packing.

Ore Treatment.

Ore hoisted from mine, 77,458 tons; ore from surface dumps, 22,768 tons; waste sorted on mine, 6,960 tons; ore sent to Apex plant, 93,266 tons; waste sorted at Apex, 16,066 tons; total waste sorted, 22.97 per cent.; tonnage milled, 76,700 tons; value of ore before milling, 8.95 dwt.; assay value of residues, 0.489 dwt.; gold obtained, 30,885 ounces; gold obtained per ton milled, 8.051 dwt.

Compared with the previous quarter there was a decrease of 1,700 tons in the tonnage milled, and a decrease of 2,108 ounces in the gold obtained. The value of the ore before milling decreased 0.65 dwt. The percentage of waste sorted increased slightly from 22.14 per cent. to 22.97 per cent.

The average value of the residues shows a satisfactory decrease of 0.219 dwt. per ton milled compared with the previous quarter.

There was a considerable reduction in the tonnage from surface dumps sent to the mill during the quarter, the percentage being 22.7 per cent., as compared with 30 per cent. for the previous quarter.

The milling plant worked to its full capacity through the quarter.

Of the total revenue from gold the sum of £29,195 10s. 10d. represents the estimated premium, being at the rate of 18s. 10.87d. per ounce, and equivalent to 7s. 7.35d. per ton milled.

Compared with the previous quarter the total working expenses show an increase of 4s. 4.121d. per ton milled. Of this amount about one-half is increase in mining costs, as a considerably greater tonnage was mined than milled; also the decrease in the premium on exchange of gold drafts, together with heavier expenditure on account of leave and holiday pay, and increase in staff under "general expenses—mine," largely accounts for the balance.

The working profit shows a decrease of 11s. 5.13d. per ton milled, of which amount the sum of 5s. 6.23d. is due to the lower premium on gold.

The capital expenditure amounted to £50,000, made up as follows:—Mine, £30,882; engines, air compressors, and boiler plant, £8,677; reduction plant, £995; surface works, buildings, etc., £10,052; total, £50,606.

The average number of coloured labourers at work during the quarter was 2,303, compared with 1,924 for the previous quarter. The miners' strike in February, causing a loss of one day's work underground, did not materially affect milling operations. The company's intention to erect a portion of the lately acquired Simmer Deep-Jupiter reduction plant has been deferred. As it appears improbable in the present condition of the money market that the options due to be exercised by the 1st July, 1921, will be taken up, it has been decided to devote the company's available cash resources to development on the mine, and to continue on the present scale crushing operations at the Apex plant.

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EDITORIAL.

THE NEW METALLURGY.

The metallurgical experiments which have for some time past been proceeding at the Brakpan and Springs Mines, and which have been most carefully superintended and investigated by the technical staff of the C.M.S. group, are now about to be translated into terms of actual practice at the Springs Mines.

In another portion of this issue, we briefly record the essential ideas of this departure from the standard Rand method, and state the anticipated benefits which are reasonably expected to accrue from the adoption of a system which probably marks a greater advancement in the metallurgy of gold than anything which has happened since the introduction of tube mills on the Rand sixteen years ago.

The underlying idea of the new method—and its efficacy has fairly conclusively been demonstrated by tests extending over a substantial period of time and involving the treatment of several thousands of tons of ore—is the elimination of the stamp battery.

The crushing capacity of Springs Mines is to be increased by 10,000 tons per month by the installation of additional tube mills. The headgear fines will be fed direct into the tubes, and by means of finer grinding in the tube mills a substantially better extraction will thus be secured than is being obtained at present.

Adoption of this method at Springs Mines may well lead to the elimination of that costly contrivance, the gravity stamp, from new milling equipments altogether, and it is quite conceivable that the next milling installations erected on the Rand will have a simple flow sheet made up in its main essentials as to (1) crushers; (2) tube mills; and (3) filter presses.

In other words, the stamp battery and the sands plant will be eliminated, and the process will, in brief, be all sliming.

The Springs-Brakpan experiments indicate that a saving of 30 per cent. in capital cost, less operating charges, and lower residues can be obtained by the adoption of such a system. And it may be emphasised that the important and extensive tests undertaken at these mines have already gone beyond the experimental stage. Increased productive capacity is to be obtained at Springs along the lines stated above, and the result of the work undertaken by Mr. Carl Davis and his metallurgical lieutenants may well lead to highly important reforms in the recovery of gold, with resultant substantial benefits for this and other auriferous centres.

THE COAL COMMISSION'S REPORT.

We have received from the Government printers a copy of the report of the Coal Commission, and would direct the attention of all who are interested in this important and growing branch of the mineral industry of South Africa to the extremely valuable data which are to be found within the blue covers of this sixty-seven page official document.

A summary of the findings and recommendations of the Commission was printed in this Journal some weeks ago, and in this issue we reproduce some of the essential facts and figures relative to this, the second largest mineral industry of the country from the point of view of value of produce. Coal has to-day outstripped the stagnant diamond industry in wealth of output, and the facts and figures contained in the Commission's report serve to show that although we are still " small fry " by comparison with other big industrial countries, both in respect of production and resources, the collieries bear no small brunt of the responsibilities and revenue of the country, and contribute in large degree to its prosperity. The report goes much further than its original terms of reference, which were to " Enquire into certain matters concerning the grading and producing of South African coal."

It constitutes, in fact, a general guide to the coal industry of the Union, its past achievements, future promise, its technology and trade, its relation to the railways, and its outlook in the export field. A most valuable appendix is a lengthy report by Mr. J. A. Vaughan on spontaneous combustion and there are many informative tables and statistics relating to outputs, allocation of production and resources, etc.

The extracts published in this number, and which will, as space permits, be further drawn attention to next week, will serve to show the comprehensive nature and authority of this latest and unusually informative Blue Book, the contents of which must necessarily find further and extended mention in our forthcoming Second Special Coal Number, which is now in course of preparation, and which promises to be an even larger and more informative work than the first coal number, published eighteen months ago.

Whilst generally commending the Government's publication, we cannot help expressing surprise at the figures given in respect of the Union's coal resources. The estimate given is 56,200,000,000 tons. Figures of this nature are obviously approximate. But the calculation employed by the Government Commission is the antiquated estimate framed by the Geological Survey ten years ago. Since then a vast amount of exploratory work has been done on our coal measures, and very large areas have been added to the known and presumptive areas of ten years ago. Just recently some hundreds of millions of tons of coal have been proved to exist in new propositions, and the 1911 estimate is now generally admitted to err on the conservative side.

Similarly, the coal resources of Rhodesia are given at 569,000,000, a figure based on another totally obsolete survey. In this regard we will merely point out that the Wankie area alone is now estimated to contain six thousand million tons of good coal.

We shall have a great deal more to say about South Africa's coal resources in our forthcoming Special Coal Number, in which, too, other portions of the Commission's report will be subjected to a more searching examination and review than is possible in an ordinary and weekly impression of the Journal.

Notes & News.

Rezende Dividend.

An interim dividend of 20 per cent., or 4s. per share, has been declared by the Rezende Mines, Ltd.

* * * *

Chamber of Mines Quarterly Meeting.

The next quarterly meeting of the Chamber of Mines will be held on Monday next, when some interesting statements regarding the relations of the Chamber with the men's unions may be expected. The agenda for the meeting deals mainly with "industrial conditions of white employees, collieries committees, and various related matters." The reply of the men's unions to the Chamber's proposed reduction in wages will doubtless be dealt with, and altogether the meeting next Monday promises to be of unusual interest.

* * * *

Delagoa Bay Directory.

Through the C.F.L.M. Agency of Johannesburg we have received from Messrs. W. Bayly and Co., of Lourenco Marques, a copy of the Delagoa Directory for 1921. The work is a mine of information regarding the town, port and district of Lourenco Marques, and other districts of the Province of Mozambique. As it is the only directory of its kind covering the Province, it should be in the hands of everyone interested in, or doing business with, our East Coast neighbours.

* * * *

Mozambique Cement.

In another part of this issue will be found a brief reference to the progress being made with the construction of the Mozambique Cement Works near Lourenco Marques. The promoters of the industry have much in their favour, principally cheap labour and low working costs owing to proximity to the raw materials. Moreover, a growing market for the product exists at the doors of the industry, and, given competent technical direction, there seems every reason to anticipate success.

* * * *

Position of the Nigel.

Some interesting facts came out at the Nigel annual meeting held in Pietermaritzburg the other day. Mr. Leonard Line, who presided, said the closing of the mine had attracted offers for the clean up, but Mr. Thorburn, who was entrusted with the work, had secured £4,645 to the company after paying all expenses of the recovery and treatment. His highly skilled services had practically completed the clean up. The drive on the 16th level was progressing satisfactorily, and would enable the company to test its improved deep level claims earlier and more economically than could otherwise have been the case, and the Sub Nigel, with which the company was working, would also obtain valuable information. As to the resumption of operations with working costs approximately 50 per cent. above the pre-war figure, and having regard to the precarious position of producing companies, the directors thought the time for resumption would be when things were more settled and the margin between working costs and values would not be so perilously small. Since 1914 costs had increased 8s. 3d. per ton and the average wage per white employee from £28 6s. per month in 1914 to £42 2s. in 1920, a difference of £13 6s.

* * * *

Geduld.

A cable sent to London during the week stated that the average value of the reef struck in the No. 7 shaft of the Geduld was .6 dwt. The fact that the reef values in the neighbourhood of the shaft have been consistently high goes to show that too much importance need not be attached to the values in the shaft. Development is, after all, the best test, mere isolated patches of rich or poor reef proving nothing.

* * * *

The Labour Inquiry.

The inquiry into the origin of the miners' strike of February last proceeds apace. The elusive author of the trouble seems hitherto to have effectually covered his tracks, and the only thing the inquiry is likely to show is the extraordinarily loose methods by which the men's unions are governed. The investigation is not finished yet, and further comment must be postponed until its findings are made public.

* * * *

Luipaardsvlei No. 10: An Important Discovery.

A few days ago a conglomerate bed identified as the Randfontein Leader was encountered at a depth of 770 feet in the borehole which the Coronation Syndicate is putting down on the farm Luipaardsvlei No. 10 on the Western Witwatersrand. The hole is now being continued to the West Reef horizon which ore body, it is anticipated, will be intersected at a depth of 200 to 300 feet below the Leader. At the time of going to press the drill was down to a depth of 880 feet. It need hardly be pointed out that the results of this boring may have exceedingly important results for a portion of the Rand which has been a geological enigma for a good many years.

* * * *

Sold Out!

Although additional copies were printed, last week's issue of the "Mining Journal" was almost immediately sold out, and we have had to refuse many would-be purchasers for the simple reason that, with the exception of the solitary copy on our own files, we have not another impression of the issue in the office. One gentleman informed us that he had secured the last copy in the Transvaal, and another reader stated that he could have procured 3s. 6d. for his last week's copy! The demands for the Journal are becoming so great that those who wish to become regular subscribers or who may desire to procure occasional copies are advised to make early application. Next week's issue will be specially attractive and immediate application for copies is essential in order to avoid disappointment. Many orders, too, have already been looked for the Second Special Coal Number of the Journal, which will be on sale in a few weeks' time, and although a very large issue of this Number will be published those desirous of procuring copies should forward their names to this office at the earliest opportunity.

* * * *

A New Mining Lease for the Far East Rand?

The Springs people are agitating to have the eastern portion of the farm Geduld thrown open to public tender as a State lease. It will be remembered that the area in question has already been so offered by the Government, but no tender sufficiently attractive was received. It may be that the improved development on the Geduld mine and the good results from the New State Areas to the south have made the ground more attractive in the meanwhile.

On the other hand, the moment is not propitious for raising capital for any form of venture, and it may be that until the present industrial troubles here, and the even more critical ones in England are settled nothing can be done to raise the globular seams necessary to make a new State mine of the eastern portion of the farm Geduld.

* * * *

" The S.A. Engineers' Directory ": New Edition.

The new 1921-22 edition of the *S.A. Engineers' Directory* published at this office will be issued next week. The work is the most complete and exhaustive of its kind, and includes this year many new features. An important section of the book is a detailed revised mining directory of the Union, to which are added municipal, railway, architects', builders and contractors' directories. No business man can afford to be without this work, orders for which may be placed at this office.

* * * *

Coal and the New Union Government Loan.

The terms and conditions of the new Union Loan to be floated by General Smuts in London have not yet been announced. That the interest offered will have to be high enough to compete with the many other public issues now being made goes without saying. It is understood that most of the new money to be raised will be devoted to railway development, and in this connection it is hoped that the Prime Minister's advisers will not allow him to forget the crying needs of the coal areas in allocating the capital expenditure. Indeed, the coal resources of the country would amply justify the earmarking of a big share of the proposed loan, or the flotation of a special loan, for the sole object of developing and conserving them. Properly explained and described, as we hope our forthcoming Coal Number will succeed in doing, the coal assets of this country should attract the imagination of capital overseas and secure for the Union the globular millions necessary for the realisation of their fullest possibilities. The question is, has the Government the vision and the enterprise essential to the framing and successful completion of so vast a project?

* * * *

The Cable Breakdown.

Our protest of last week against the delays in the cable service has evoked general support in the Press, and we have received numerous instances from readers of the expense and inconvenience to which they have been subjected by the outrageous cable delays. On closer enquiry we find that the real culpit in the matter seems to be the cable company. It would appear that before the War the cable companies, in the belief that wireless would compete with them in an ever-increasing degree, failed to maintain their cables at the highest point of efficiency. In other words, they saved on maintenance and upkeep, with the inevitable result that when the War came and upkeep became more difficult than ever their services seriously and progressively deteriorated. So bad did things become that it has not been possible, apparently, to " catch up " with the damage done, and the result is with us to-day in the sadly impared efficiency of our cable service. The question naturally arises out of this as to the fate of the important wireless sets that performed such excellent service in war-time in East and Central Africa. Their disappearance at a time like the present, when they might be expected to render great help in dealing with messages is difficult to explain. Indeed, the failure of wireless to fulfil expectations up to the present is one of the problems of the day. Atmospheric troubles, equally with difficulties of conflicting legal rights, seem to be the obstacles to successful freedom of the ambitious schemes cherished after the War. Meanwhile, business in this country suffers acutely from faulty cable communication, and we anxiously await Government action in the matter.

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Western Main Reef.

We have received a copy of the prospectus of the Western Main Reef, Ltd., which it is sought to float with the ambitious nominal capital of one million pounds, under the Company Laws of Rhodesia. The directors are: J. A. Dieperink, Esq., Mayor of Krugersdorp, Monument Street, Krugersdorp; W. Miller, Esq., mine captain, 21 Hout Street, Belgravia; Max Michaelis, Esq., merchant, Johannesburg; J. de Villiers de Beer, solicitor, Pretoria. Two further directors are to be appointed by the company. The company is acquiring from M. Lesser cession of a number of options over properties in the Krugersdorp area. The prospectus states, inter alia:—It will be observed that the assets being acquired by the company may be divided into three groups —(1) the Main Reef discovery; (2) the Rietfontein Reef discovery; and (3) the Colorado Formation discovery. Mr. E. Kumst, consulting engineer, who has made these discoveries, has worked for 15 years in the West Rand and has spent many thousands of pounds in his research work. Mr. Kumst reports that his Main Reef discoveries on the Krugersdorp Townlands, have confirmed the theories of Mr F. P. J. Struben, the well-known authority, and the first man to crush ore on the Rand after the discovery of gold in 1885. Mr. Kumst has placed the company in possession of a sketch given to him and signed by Mr. Struben, in which he shows the position of the Main Reef series on the West Rand, which thoroughly agrees with Mr. Kumst's discoveries. As a matter of fact, arrangements are being made in London by Mr. Struben to push ahead the opening up of a part of this new Main Reef discovery, under Mr. Kumst's supervision. This is in no way connected with the proposals of the Western Main Reef, Limited, but is cited to indicate the definite nature of the discovery. A number of practical mining men working in the vicinity, having examined the workings, most emphatically pronounce it to be the long lost Main Reef. Mr. Kumst says: " Coming to the extension of the Main Reef series both east and west from Central Rand, it will be necessary to state what our leading geologists have laid down as to what that Main Reef consists of, and where it is found in our Rand strata on the dip of the Government Reef. They state that the true Main Reef series consists in descending order of Main Reef, Main Reef Leader, South Reef, Livingstone Pebble Beds, and Bird Reef, the latter having its underlying mud bed which is an amygdaloidal-diabase interbedded sheet. In my opinion, it would be a fair question to ask any of these gentlemen whether they found outside the Central Rand, a true section as laid down by themselves. In my opinion their answer to this question would be in the negative. Now, having discovered on the Krugersdorp Townlands the Main Reef series of reefs on the dip of the Government Reef, as laid down by our geological experts, I definitely claim that it is equal in every way in its stratigraphical position to the Main Reef series of the Central Rand."

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Our Essay Competition: The Last Week.

Readers are reminded that the **" Mining Journal's " Essay Competition closes on July 1st. A prize of £25 is offered for the best contribution on " How to Improve Efficiency and Lower Working Costs in and on the Mines of the Witwatersrand." A number of valuable replies already have been received and competitors are urged to send in their essays without delay.**

MINES DEPT. EXAMS., 1920—1921.
CERTIFICATES AWARDED INSTITUTE.

SURVEYOR'S CERTIFICATES—March, July and October (Extra) Exams., 1920. 100 per cent., 50 per cent., and 66 per cent. respectively of S.A. total.
MANAGER'S CERTIFICATES.—Two Exams (Sept., 1920, Jan., 1921). 17 out of total 28 in S.A.; 12 Certificates, May, 1921.
OVERSEER'S CERTIFICATES.—Two-thirds of the S.A. total for year 1920. 75 per cent. for January, February, March, 1921.
COAL CERTIFICATES.—Candidates being enrolled.

Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St.

THE BUSY MAN'S PAGE.

Information for Investors.

Modder East Debentures.

A circular has been issued to shareholders offering them participation in £300,000 of an issue of £400,000 registered debentures at par, to be issued after the expiry of the current £500,000 bearer debentures, due for redemption on July 31. The main features of the issue are:—The issue is at par, redeemable at par on December 31, 1922. Interest is payable half-yearly at 8 per cent. per annum as from July 1, 1921. Holders will have option of exchanging their debentures for shares at par during the currency of the loan. Holders of the present issue of bearer debentures can subscribe by cash or can surrender their present bearer debentures in exchange for an equivalent amount of the new issue. In the latter case the premium of 5 per cent. will be paid in cash on due date. Security:—The £400,000 will be a first charge upon all the assets of the company, and the circular points out the satisfactory nature of the security. Applications by holders of the current bearer debentures can only be satisfied out of such portion of the £300,000 abovementioned as may not have been applied for by shareholders of the company. All applications for the above issue must reach the office of the company on or before 23rd July, 1921.

Food Prices in Britain.

The British Ministry of Labour gives the percentage increase in food prices in June, 1921, for the United Kingdom over pre-War prices as 118, as compared with 132 per cent. for May.

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Metal Market.

Latest quotations: Standard copper, £73 1s. 3d. cash and £73 3s. 9d. forward; electrolytic copper, £77 cash and £79 forward; Straits tin, £168 15s. cash and £171 15s. forward; English lead, £22 5s. cash and £22 forward; bar silver, 35d.; and fine gold, 109s. 2d. per oz.

It is announced to-day that the Bank of England rate of discount has been reduced to 6 per cent. In November, 1919, the bank rate was raised from 5 per cent. to 6, and in April, 1920, to 7. On April 28, 1921, it was reduced to 6½.

In the House of Commons on June 16th, Sir William Mitchell-Thompson, Parliamentary Secretary to the Board of Trade, stated that 1,165 ships of a total net tonnage of 1,707,000, were laid up in the United Kingdom on April 30

What to Read in the Technical Press.

Coal.

How to Maintain Coal Efficiency in Storage System.—Coal Trade Journal, May 11, p. 560.

Powdered Coal and Brequettes.—Colliery Guardian, May 20, p. 1463.

Coal v. Oil Fuel.—Colliery Guardian,, May 20, p. 1467.

Coal Cleaning by Air Flotation.—Colliery Guardian, May 20, p. 1469.

Pulverised Brown Coal.—Colliery Guardian, May 27, p. 1532.

Fuel Economy.—Colliery Guardian, May 27, p. 1536.

Mining.

Protection for the Promoter.—Mining and Scientific Press, May 14, p. 673.

For the Ensuing Technical Society Meetings.

Geological Society of South Africa.

The next monthly meeting of members of the Geological Society of South Africa will be held in the Reading Room, 1st floor, Scientific and Technical Club, 100, Fox Street (between Rissik and Loveday Streets), Johannesburg, on Monday, 27th June, 1921, at 8.15 p.m.

The following papers will be read:—" The Nature of the Tin Deposits near Kuils River, Stellenbosch district, and their relation to Other Occurrences in the Neighbourhood," by A. V. Krige, M.Sc.; " On Some Mineral Occurrences in the Namib Desert," by P. A. Wagner, D.Eng., B.Sc.; " On the Occurrence of Oil in Madrid, No. 281, in the Bethlehem District of the Orange Free State," by A. L. Hall, M.A., F.G.S.

Metallurgy and Chemistry.

The annual general meeting of the Chemical Metallurgical and Mining Society will be held in the Scientific and Technical Club, 100, Fox Street, Johannesburg, on Saturday, the 25th inst., at 7.45 p.m. Business: Election of new members; report and balance-sheet; declaration of ballot; general business; paper for reading, " Distribution of Gold in the Witwatersrand Banket Ore, with Reference to Milling and Cyaniding Operations," by F. Wartenweiler; symposium, " Miners' Phthisis "; reply to discussion: (1) " The Ideal Mining Law," by C. J. Gray; (2) " Cementation of the Substrata of the Mazoe Dam Retaining Wall," by Dr. G. A. Voskule; (3) " Chemical Methods of De-aeration of Water Solutions," by H. A. White; discussion: (1) " Treatment of Antimonial Gold Ore at the Globe and Phoenix Mine, Southern Rhodesia," by V. E. Robinson; (2) " Occurrences of Fire Damp on the Far East Rand," by T. N. Dewar; (3) " Methods used in the Detection and Investigation of Vitamines," by Dr. E. Marion Delf; (4) " Notes on some Technical Methods of Analysis," " Notes on some Reactions of the Xanthates," by A. Whitby and J. P. Beardwood.

Cost of Living in Britain.

It is officially stated that the cost of living on May 31 was 119 per cent. above the pre-war level, namely, in July, 1914. This represents a drop of nine points compared with April 30, when the increase stood at 129 per cent.

New Type of Locomotive.

The London and North-Western Railway is experimenting with a new type of locomotive, in which an electric turbine replaces the existing method of propulsion. It is hoped that the innovation will give a much higher speed and reduce running costs.

The Week in the Sharemarket.

QUIET AND EASIER—GOLD DIVIDENDS AND THE PREMIUM—SILVERS AND COLLIERIES.

Despite not unsatisfactory dividends and the higher gold premium, the market in gold shares this week has been quiet and easier. The values from the Geduld No. 7 shaft were, of course, somewhat disappointing, and had a slightly depressing effect on Far East shares in general. The gold premium fluctuated from about 108s. to 111s. during the week, and it is thought that with the influence of the American harvest it may improve further during the next month. In view of the improvement in this direction it is considered unlikely that the Chamber of Mines and the men will fail to come to agreement at the end of the month on the wage reduction question. Dividends on the whole are satisfactory, the Far East Rand, as usual, being well to the fore. Tin and diamond shares have been lifeless during the week, and colliery shares were also disappointingly quiet. In silvers Transvaals were easier on the usual crop of market rumours, and Pretorias moved in sympathy. As regard the latter, we are advised that there is no justification for the rough handling they are getting at the moment. True they have had a little difficulty in striking a mud pocket in the sinking, but this is well away from the reef and has nothing whatever to do with the values of ore on the property.

	Fri. 17th.	Sat. 18th.	Mon. 20th.	Tues. 21st.	Wed. 22nd.	Thur. 23rd.
Anglo-Amer Corp. .	17 9*	17 3*	17 *	17 3	17 3	17 0*
Apex Mines	7 9*	7 6*	7 6*		7 6*	7 6*
Bantjes Cons.	5 0*	5 0*	5 0	—	4 10*	4 9*
Brakpan Mines . . .	52 6†	—	53 6†	—	—	—
Breyten Colls. . .	—	—	—	—	5 0*	—
Brick and Potteries .	-	4 0*	4 0*	4 0*	4 0*	4 0*
Bushveld Tins	0 7*	0 7*	0 7*	0 7*	0 7*	0 7*
Cassel Coals	30 0†		—		—	30 0†
City Deeps	43 0*	44 0*	45 0	44 0*	44 0*	44 0
Clydesdale Colls. . .	28 · 6	28 0*	28 0*	28 0	28 0	27 0*
Con. Diamonds . . .	11 3	—	-	11 0*	11 *	—
Con. Investments . .	—	23 0*	23 6*	—	-	24 0†
Con. Langlaagtes . .	11 6†	11 6†	11 6*		10 0*	11 0†
Con. Main Reefs . .	10 0*	9 9*	10 0	9 7½	—	9 6*
Con. Mines Selection	—	-	-		9 9*	—
Coronation Colls. . .	42 6*	42 6*			-	42 6*
Do. Freeholds . .	0 9	—	0 9*	0 9*	0 9*	0 9*
Do. Syndicates . .		6 0*	—	—	7 0†	—
Crown Diamonds . .	2 8*	2 9	2 9*	2 9	2 9*	2 6*
Crown Mines	40 0†	40 0†	-	35 0*	36 0*	36 0†
Daggafontein Mines.	3 0*	3 1*	3 0*	3 0*	3 1*	3 1*
E.R. Coals	2 1*	—	—			2 0*
E.R. Deeps	0 6*	0 6*	0 6*	0 6*	0 6*	0 6*
E.R. Props.	4 7½	4 6*	4 6*	4 6*	4 9b	4 6*
E.R. Debentures . .	£70	£70*	£70*	£70*	£70*	£70*
Eastern Golds	0 7*	0 7*	—	0 6*	0 6*	0 7*
Frank Smith Dmds.	2 7*	2 8*	2 6*	2 6*	2 6*	2 6*
Geduld Props.	50 9*	50 9	50 9	48 6	48 0*	
Glencoe Colls.	14 0*	14 0*	14 0*	14 0*	14 0*	14 0*
Glynn's Lydenburgs	8 9†	9 0†	9 0†	8 9†	9 0†	9 0†
Govt. Areas	79 3*	79 3*	79 0*	79 0*	79 3*	79 6*
Knight Centrals . .	3 9*	3 9*	3 9*	3 10*	-	3 9*
Hume Pipes	16 0*	-	16 0*	16 0*	16 0*	—
Lace Props.	7 0*	7 0*	7 0*	7 0*	7 0*	7 0*
Leeuwpoort Tins . .	10 6†	10 0*	10 0*	9 9†	8 9*	9 0*
Lydenburg Farms .	5 6*	5 6*	5 6*	5 6*	5 7*	5 7*
Meyer and Charltons	81 6*	81 6*	82 0	82 0*	82 0*	—
Modder B.'s	26 6*	26 6*	26 6	26 0	25 6	25 3*
Modder Deeps . . .	-	43 6*	44 3	43 3	42 9	43 0
Modder Easts	10 0*	10 0*	10 0	9 9	9 3	9 3
Natal Navig. Colls..	36 0*	36 0*	36 3*	36 3	36 3*	36 6*
National Banks . . .	230 0*	230 0*	225 0*	230 0a	225 0*	225 0a
New Eland Dmnds. .		—	25 0†	22 0†	21 0†	17 0*
New Era Cons. . . .	6 6*	6 6*	6 6*	6 6*	6 6*	6 6*
New Geduld Deeps .	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
New Kleinfonteins .	5 9	—	5 6*	5 3*	5 3*	5 3*
New Modders	66 0*	65 0	66 3	65 6	65 3	65 0*
New States	22 0*	22 6	—	21 9	21 6b	21 6*
Nigels	4 3*	—	4 0*	—	4 0*	4 0*
Nourse Mines	6 6*	-	6 6*	—	6 9*	—
Pretoria Cements . .	51 9*	51 9	51 0*	51 0*	50 6*	50 0*
Princess Estates . . .	1 0*	1 1*	1 0	1 0	1 0*	0 10*
Rand Nucleus	1 0*	1 0*	—	1 0*	1 0*	1 0*
Randftn. Estates . .	13 3*	12 3	13 3*	13 3*	13 0	12 9
Roberts Victors . . .	6 3*	6 0*	6 3*	6 0*	6 0*	—
Rooibergs	5 6†	5 6†	5 6†	4 0*	—	5 3†
Rouxvilles	1 3*	1 3	1 0*	1 0*	1 0*	1 0*
S.A. Lands	4 3*	4 3	4 3*	4 2	4 1*	4 0*
S.A. Townships . . .	10 9*	10 6	10 3*	10 0*	10 0*	10 0*
S.A. Alkali	15 6	16 6	15 6	15 6	14 6	15 0*
Do. Options	—	—	—	—	1 0*	2 6*
South Van Ryns . .	2 0*	2 7	2 6*	2 6*	2 7*	2 7*
Springs Mines . . .	34 3*	34 6*	34 6*	34 6	34 3	33 9*
Sub Nigels	11 6*	12 0†	11 6*	11 6	11 6	11 9
Swaziland Tins . . .		6 0*	8 0*	8 0*	—	10 0*
Transvaal Lands . .	—	—	16 3*	17 3†	—	17 0*
Transvaal G.M. Est.	7 6*	7 6*	8 0†	7 6*	7 6*	7 6*
Transvaal Silvers. .	26 0*	25 9*	25 3*	25 3	25 3	24 6
Tweefontein Colls. .	—	19 0†	—	19 0†	—	—
Union 5 per cent. . .	£98*	£98¼*	£98¼	£98¼	£98*	£98*
Van Ryn Deeps . .	74 0†	73 0†	71 3	71 3	70 9*	71 0*
Village Deeps	7 0*	7 0*	7 0*	7 6*	7 3*	7 0*
West Rand Cons. . .	2 0*	2 0*	2 3	2 0*	2 0*	2 0*
Western Rand Est.	—	3 3*	3 3*	3 3*	3 4*	3 4*
West Springs	10 3*	10 3*	10 3*	10 6	10 3	10 0*
Witbank Colls. . . .	45 0*	45 0*	45 6*	45 0*	—	—
Witwatersrands . .	12 6*	12 6*	—	12 6*	—	—
Wit. Deeps	6 6	6 0*	6 3*	—	—	6 0*
Wolhuters	3 4*	3 5†	3 3*	3 6†	—	3 6†
Zaaiplaats Tins . . .—	3 5	—	3 4*	3 5†	3 3*	3 5†

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Concerning Mines and Men.

Mr. W. J. Clarkson, the retiring secretary of the S.A. Institute of Electrical Engineers, was the recipient of a valuable presentation at the last meeting of the Institute.

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The annual general meeting of members of the South African Institution of Engineers was held in the Scientific and Technical Club, 100 Fox Street, Johannesburg, on Wednesday, the 15th instant, at 8 p.m. Mr. W. Elsdon-Dew, past president, took the chair in the absence of the retiring president, Mr. James Whitehouse. The following officers and members of Council were elected for the ensuing year:—President, Mr. R. C. Atkinson; vice-presidents, Messrs. J. W. Kirkland and T. G. Otley; hon. treasurer, Mr. Edward Goffe; auditor, Mr. F. W. Bompas; members of Council—Messrs. W. Buchanan, R. Craib, D. M. Davidson, J. H. Dobson, W. Elsdon-Dew, W. Martin Epton, C. E. Mason, P. M. Newhall, John Orr, H. S. Potter, A. Robertson, and J. J. R. Smythe. Mr. Alpheus Williams was elected to represent the Kimberley Branch on the Council, and the retiring president, Mr. J. Whitehouse, was also ex. officio a member of the Council.

Stormberg Diamonds.

In the course of a letter to the *Cape Argus*, with reference to the exhaustion of certain alluvial deposits at Aliwal North, Mr. John Carver says:—Having made a tour through the Stormberg area, which comprises the districts of Sterkstroom, Tarkastad, Molteno, Wodehouse, Burghersdorp and Aliwal North, and having closely prospected a few of those districts, there is no doubt in my mind concerning the existence of " pipes " in the whole Stormberg area. I know for an actual fact that " pipe " diamonds have been found. I also know that extinct volcanoes to the number of over 100 are to be seen in the above and adjoining districts; anybody who takes enough interest in this matter to turn up existing works on the geology of the Cape Colony will soon be rid of all doubt. In the district of Molteno there is good evidence of volcanic activity. Diamonds have been discovered there also. In various places volcanic action has spoiled the coal seams, which accounts for the large areas of " burnt coal " which can still be seen in that district.

Far East Government Leases.

STATE MINES, SPRINGS, BRAKPAN, AND WEST SPRINGS.

Springs Mines.

In the course of his report on the Springs Lease, the Government Inspector writes:—

The figures show an increase of 156,971 tons in the payable reserves during the six months period, the corresponding total average width and value being practically the same in both estimations.

With the exception of two small blocks of ore, the present reserves have been based on a minimum stoping width of 55 inches, whereas in previous estimations the limit of width was 50 inches. This results in the pay limit being raised from 250 to 275 inch pennyweights.

A very satisfactory increase of reserves has taken place in the payable zone being opened up towards the eastern end of the east haulage, although this body will not be available until the connections, now proceeding, are made with the haulages to the north and south of it.

The average working costs per ton milled for the six months July to December, 1920, were 30s. 9d. To meet this figure, and allowing for sorting and residues, ore of a block value of approximately 6½ dwt. would require to be mined, on the basis of the normal or pre-war price of gold. In order to make 5 dwt. ore payable to mine with working costs as above-mentioned, gold would have to realize £5 13s. per ounce. About 30 per cent. of the total reserve tonnage has a value below 6½ dwt.

Shaft Sinking. — No. 3 Shaft.—Considerable progress has been made with the station roadways, ore and waste bins, the footage accomplished in connection therewith amounting to 716 feet. There were also 521 feet of haulage ways driven from this shaft. No. 4 Shaft.—No sinking was done during the quarter. Work in connection with the winding plant has been carried on, and a portion of the permanent steel headgear has been delivered on the property. Compared with the previous quarter, there has been an increase in the footage developed of 409 feet, and an increase in the footage sampled of 985 feet, whilst the payable footage has increased from 53.3 per cent. to 56.8 per cent. The average value has increased slightly, from 618 inch pennyweights to 630 inch pennyweights. Of the total revenue from gold, the sum of £45,989 1s. 10d. represents the estimated gold premium, being at the rate of 18s. 11.07d. per ounce, and equivalent to 8s. 3.257d. per ton milled. The estimated premium for the previous quarter was equivalent to 13s. 10.44d. per ton milled. Exchange for the quarter included in the gold revenue shows a credit of £353 1s. 6d., as compared with £7,973 9s. for the previous quarter. The total working costs compare with those of the previous quarter within the fraction of a penny. The working profit, excluding premiums on exchange and gold, shows a decrease of 4.44 pence per ton milled, but including both premiums the profit shows a decrease of 7s. 3.48d. per ton milled compared with the previous quarter. To the working profit of £77,673 7s. 5d. may be added the sum of £1,590, representing the difference between the estimated premium and actual premium on gold for the three months ended 28th February. The average number of coloured labourers at work was 4,823, as compared with 4,480 for the previous quarter. During February a sectional strike of the underground employees took place, which adversely affected operations that month. Seven working days were lost as a result of the strike. During the quarter the Consolidated Mines Selection Company, Limited, in terms of the mineral lease, took up 7,000 shares in the unissued capital of the company at £3 per share, to provide further working capital. The issued capital of the company now is £1,274,236.

Government Gold Mining Areas.

In his report for the quarter ended 31st March, 1921, the Government Inspector writes:—

Compared with the previous estimation of reserves as at 31st December, 1919, which was based on similar limits as to value and width, the total reserves show a decrease of 710,566 tons.

Comparing the width and value of the reserves, it is found that, whilst the former remains the same as in the previous estimation, the latter has dropped 0.47 dwt.

This decrease in the reserve tonnage is not due to the falling off in value of the development, as the payable percentage of the development on reef for the year 1920 was slightly higher than that for the preceding year, but it is owing to the primary development footage opening up new ground being less during 1920 than during 1919, and also to the elimination of certain areas formerly considered payable. As the reserves at the end of 1919 were well ahead of the mill, it was considered desirable to confine the year's development work more to the opening up of existing reserves than to their increase. Based on the mining data over the last two years, giving the sources from which the milling rock has been obtained during that period, and assuming that development proceeds at its normal rate, the mine may be said to be about eight years ahead of the mill.

Taking gold at its normal, or pre-war value, and allowing for sorting, residues, etc., the limit of 4 dwt. on which the calculation of the ore reserves has been based, is not sufficiently high to meet the average working costs for the year 1920, which were 22s. 6d. per ton milled, as the reserve value required to meet such costs approximates 5 dwt. Ore reserves of 4 dwt. will only meet these working costs when gold realises about £5 10s. per ounce. Of the total ore reserves, about 18 per cent. carries a value of between 4 dwt. and 5 dwt.

West Springs.

The Government Inspector's report for the quarter ended 31st March, 1921, states, inter alia:—

Shaft Sinking. — No. 1 Shaft. — The footage sunk amounted to 468 feet, and the footage timbered to 472 feet, the total depth of the shaft being 3,892 feet, of which 3,872 feet are timbered. The main reef was struck during March, the contact with the shale footwall being at a depth of 3,890 feet. The reef proved to be of considerable width, the full channel being 100 inches. Samples taken over the full width at 22 points showed the reef to be of low value, the average being 2.04 dwt. A commencement has been made with the cutting of the main station. Compared with the previous quarter, there was a decrease of 78 feet in the footage sunk, and a decrease of 76 feet in the footage timbered, due to the suspension of sinking operations for seven days on account of the miners' strike in February. No. 2 Shaft. —The footage sunk amounted to 174 feet, and the footage timbered to 172 feet, the total depth of the shaft being 2,590 feet, of which 2,564 feet are timbered. Compared with the previous quarter, there has been a decrease of 293 feet in the footage sunk and 295 feet in the footage timbered. Sinking operations were suspended in January, and a commencement made with the cutting of a pump chamber and sumps at a depth of 2,150 feet. This work was completed in March and sinking operations resumed. This shaft was also held up for seven days by the strike above referred to. The shaft was sunk in quartzite throughout the quarter. The following is a summary of the development work carried out from the Springs Mines property:—Haulage-ways, 517 ft.; footage on reef, 412 ft.; footage sampled, 420 ft.; footage payable, 245 ft., equal to 58 per cent.; average reef channel width payable footage, 40 inches; average reef channel value payable footage, 9.4 dwt. Compared with the previous quarter, there has been a small decrease of 14 feet in the footage developed. There has been an improvement in the percentage of payability and also in value—the former having increased from 49 per cent. to 58 per cent. and the latter from 308 inch dwt. to 371 inch dwt. The capital expenditure amounted to £74,558, made up as follows:—Shafts and equipment, £52,321; development, £11,781; buildings, surface works, etc., £4,511; general expenditure, £5,945; total, £74,558. Good progress is being made with the new boiler plant at the No. 1 Shaft; the foundations are practically completed, and the erection of the boiler is proceeding. The excavations for the two new compressors are completed Work in connection with the Recreation Hall and railway siding is well in hand. During the quarter a call of 2s. per share was made on all partly-paid shares, and advance payments were made in respect of 220 shares, making them fully paid up. At the 31st March the capital of the company was as follows:—447,169 shares fully paid up; 952,831 shares, 10s. per share, paid up.

New States.

The Government Inspector's report for the quarter ended 31st March, 1921, states, inter alia:—

North Shaft.—The footage sunk amounted to 182 feet to a total and final depth of 3,768 feet, and the shaft is timbered to the bottom. Work in connection with the stations and approaches, ore bins, etc., is making satisfactory progress, and the main connection south, towards the south shaft, has been driven 87 feet. South Shaft.—The footage sunk amounted to 116 feet to a total and final depth of 4,071 feet, and the shaft is timbered to the bottom. A considerable amount of work has been accomplished in connection with the shaft stations, ore bins, and sumps, and several development and headings have been commenced. Development.—A summary of the development work is as follows:—Total footage, 692 feet; footage on reef, 332 feet; footage sampled, 332 feet; footage payable, 332 feet; average reef channel width payable footage, 25 inches; average reef channel value payable footage, 27.4 dwts. With the exception of 87 feet driven off reef in the north shaft, the whole of the above development is in connection with the south shaft. The capital expenditure amounted to £68,903, made up as follows:—Shafts and equipment, £28,420; development and mine, £22,816; compressor plant, £9,700; other surface works, £7,967; total, £68,903. The building for the additional air compressor is completed, and one of the compressors of 30-drill capacity ready to be put into commission. The new carpenter's shop and extensions to the fitter's shop have been completed. A new change-house for whites is in course of erection at the south shaft.

Brakpan Mines.

The Government Inspector's report for the quarter ended 31st March, 1921, states, inter alia:—

During the quarter the ore reserves as at 31st December, 1920, were estimated, the pay limit adopted being 5 dwt. over a stoping width of 50 inches. There was an increase of 44,419 tons in the payable reserves, and a slight increase of 0.07 inch in the stoping width, whilst the value remains the same. The ore brought into the payable reserves during the six months consists chiefly of extensions to the former existing blocks. The development in the south-western section of the mine has not added to the tonnage to any appreciable extent. The average working costs over the six months' period July to December, 1920, approximated 28s. 3d. per ton, and to meet this figure and allowing for sorting and residues, ore of a block value of not less than 6 dwt. would require to be mined on the basis of the normal or pre-war price of gold. So long as the price of gold does not decrease below £5 2s. 3d. per ounce, the whole of the ore reserve tonnage may be accepted as payable, taking working costs as above-mentioned. About 18 per cent of the total reserve tonnage has a value below 6 dwt. Shaft Sinking.—No. 3 Circular Shaft.—The footage sunk amounted to 386 feet and the footage ringed to 405 feet, the total depth of the shaft being 4.196 feet, of which 4,161 feet are lined or ringed. The footage sunk represents an increase of 38 feet compared with the previous quarter. A narrow leader 4 inches wide was passed through at 4,078 feet, the value being 0.5 dwt. The shaft was sunk in the quartzites during the quarter. No. 4 Circular Shaft.—The footage sunk amounted to 149 feet and the footage ringed to 195 feet. Sinking in this shaft is now completed, the total depth being 4,299 feet. As mentioned in my last report, the main reef leader was intersected in January at a depth of 4,280 feet. The shaft station is now being cut, and in connection therewith 100 feet of cross-cutting has been accomplished. Development.—A summary of the development work is as follows:—Drives, 2,327 ft.; winzes and raises, 1,246 ft.; haulage-ways, 1,358 ft.; crosscuts, etc., 115 ft.; total, 5,046 ft. Footage on reef, 3,514 ft.; footage sampled, 3,500 ft.; footage payable, 1,510 ft., equal to 43 per cent.; average reef channel width payable footage, 35 inches; average reef channel value payable footage, 15.02 dwt. Compared with the previous quarter there has been an increase of 610 feet in the total footage developed and an increase of 380 feet in the footage sampled. The payable percentage of the footage sampled has decreased from 52 per cent to 43 per cent., and the average value from 593 inch dwt. to 531 inch dwt.

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South African Nickel Ore

An Interesting Report.

We understand that exploratory work on the property of the South African Nickel and Talc Mines, in the Barberton District, is proceeding satisfactorily, and that further extensive occurrences of nickel have recently been located. With reference to these, we are, through the courtesy of the Imperial Mineral Resources Bureau of London, enabled to give publicity to a letter received from Messrs. Henry Wiggin and Co., Ltd., of Birmingham, a firm of vast experience and high standing in the nickel market. The letter states:

With further reference to your letter of the 22nd April, I have pleasure in giving you now a further report on the two samples from the Scotia Talc Mines.

The two samples No. 332 and 333 were both strongly magnetic, and they must be presumed to be there as magnetie (Fe 304). The result of the two analyses is as follows:

	No. 332.	No. 333.
	%	%
Silicia (Fe_3O_4)	13.25	8.87
Magnetite	53.31	50.58
Nickel and Cobalt Oxides ...	31.34	36.40
Copper Oxide	.10	.23
Alumina	.30	.58
Magnesia	.52	.81
Loss on Ignition	1.06	3.12
	99.88	100.59

Cobalt oxide is present in both samples to the extent of about .50 per cent.

These nickel ores are very remarkable, and during 50 years experience I have never come across any ores like them. There would be two ways of using material of this kind. The one would be to melt it in a blast furnace or cupola into ferro nickel, which could be immediately used as an addition to the convertor to make nickel steel, as the impurities are very slight, and the ores being practically free from sulphur and phosphorus. If this melting is done in a reverberatory furnace instead of a cupola, the reduction of the metals can be very carefully regulated, and a material can be obtained carrying practically all the nickel but only part of the iron.

A small trial melting in a crucible would have an alloy containing 70 per cent. nickel and 26.25 per cent iron. The rest would be silica and a trace of sulphur

If, however, it should be desirable to make a pure nickel from these ores it will become necessary to introduce sulphur in order to produce a nickel-iron-sulphide. This can be done by melting with iron pyrites or with calcium sulphide (Blue Billy) or calcium sulphate. The iron pyrites have the great drawback of adding a further quantity of iron, which has to be bessemerised off afterwards, and the Blue Billy will be getting scarcer with the gradual disappearance of the La Blanc Process, so the process with the use of gypsum will probably be the best proposition.

The ideal way of treating the ore would be, of course, to smelt it in conjunction with Canadian ores, which have an excess of sulphur, and the addition of these ores to their ores would have the great advantage of increasing the proportion of nickel in their matte.

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RHODESIAN SECTION.

The Geology of Southern Rhodesia.

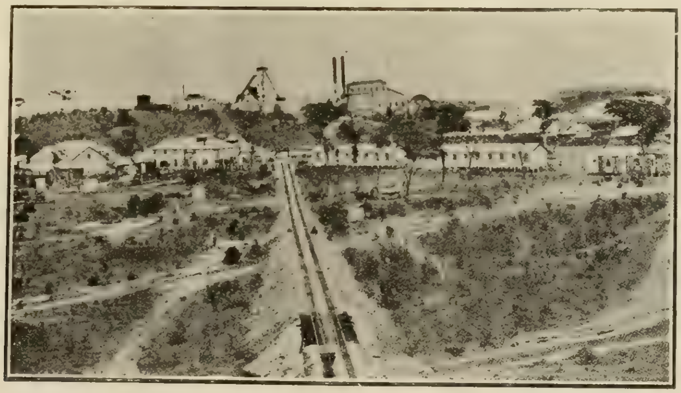
POINTS FROM THE REPORT OF THE DIRECTOR OF THE SURVEY—THE LOMAGUNDI FIELD.

The report of the Director of Geological Survey of Southern Rhodesia, Mr. H. B. Maufe, has the following references to work done during the past year:—

In the Lomagundi district no systematic mapping was carried on owing to the illness of the geologist operating there. I was able, however, to make three traverses into the outlying districts, one of which included a visit to the recently opened mica field. An account of the geology of the field, of the mode of occurrence of the mica and general methods of treatment was given in Short Report No. 10 issued on 15th November, 1920. The number of mica deposits and quality of the mica (muscovite) are favourable to the establishment of a mica-mining industry.

On this and on another traverse westwards into the Sebungwe district the beds of the Lomagundi system were shown to have a far wider extension than was previously known, and some observations were made on the varying degree of metamorphism of the beds. In this connection it was pointed out that if the graphitic slates of the Lomagundi system were found to extend into the areas of higher crystallisation, it was probable that workable deposits of flake graphite might be found. Since then some very promising flake graphite has been discovered.

Amongst the minerals identified on the mica field is beryl, often in greenish and bluish green tints, which render it probable that aquamarine of gem quality may be found. Other minerals discovered in places on the mica field comprise a few known previously in the Somabula diamantiferous gravels, and include the "indicator" staurolite. The source of these minerals had been a puzzle hitherto.



The Globe and Phoenix, one of Rhodesia's Most Famous Mines. The Globe and Phoenix Company has, through a subsidiary, acquired important interests in the Lomagundi Mica Field.

Chrome Deposits.

A third traverse included an examination of the chrome deposits in the Umvukwe hills. The chrome iron-ore occurs in seams generally less than one foot thick in the central portion of the Great Dyke. The occurrence of the chrome ore has been aptly compared by Mr. A. H. Ackerman to that of a series of coal seams lying one above the other in a basin. The seams dip towards the median line of the dyke at moderate angles, which diminish towards the centre, and there is good reason for believing that the seams extend across from the outcrop on one side to that on the other. The country-rock of the seams is usually an enstatite-rock partially or wholly altered to serpentine, but on some claims a chromite seam has a floor of enstatite-rock and a roof of serpentine, which appears to be derived either from a dunite or a saxonite.

The synclinal structure of the dyke is similar to that already described in other portions, notably by Dr. Wagner in the Belingwe district. The origin of the structure, formerly a purely scientific question, has now become of importance to the chrome miner, and will require elucidation.

The occurrence of the chrome iron ore in the Great Dyke is thus quite different from that of the chrome in the well-known deposits at Selukwe. The chrome iron ore in the Great Dyke can, it appears, be picked clean to assay over 50 per cent. chromic oxide, and the resources of the Great Dyke in this mineral must amount to many millions of tons.

Asbestos Workings.

The chrysotile asbestos now being worked in the Great Dyke is situated near the western edge of the dyke where the northern continuation of the dyke offsets to the east nearly a mile. The offset appears to be due not to a fault, but to the presence of a large quartz reef in the granite country-rock. That the line is one of weakness is shown by the presence of a later dolerite dyke penetrating the Great Dyke close to the line of the offset. The asbestos seams are vertical, of a high average width, and trend in a general east and west direction, being spaced irregularly through the country-rock as in the older asbestos deposits. The country-rock is serpentine, derived, so far as could be ascertained by eye, partly from an enstatite-rock and partly from a saxonite.

It is not yet generally realised that the chrome and asbestos deposits occurring in the Great Dyke are very much younger in geological age than the Selukwe chrome and than the Mashaba and Shabani asbestos deposits.

Some mines in the Gwanda district were visited during the year; and Mr. Macgregor visited Gwelo to examine the site of discovery of a single diamond near the Kopje. No trace of a "pipe" was found, only traces of a gravel similar to some found on the Somabula fields, which might possibly contain a few diamonds.

Mentioning with deep regret the death of Mr. A. J. C. Molyneux, geologist, the Director adds that great difficulty has been encountered in securing the services of a mineralogist with the desired training and experience.

The usual list is given of the publications issued during the year. The bulletin on the Somabula diamantiferous beds awaits for its completion Professor Seward's report on the fossil plants discovered by Mr. Macgregor. The report is expected by any mail. Progress has been made with the bulletin and geological map of part of the Lomagundi district which the late Mr. A. J. C. Molyneux had in hand, but it is not possible at the moment to say when it can be completed.

LONELY REEF.

The following are particulars of gold, etc., from the Lonely Mine for the month of May, 1921:—Mill ran 704 hours; crushed, 5,440 tons; fine gold recovered, 2,127.746 oz.; value, £8,946 5s. 5d.; slimes treated, 5,440 tons; fine gold recovered, 3,268.715 oz.; value, £13,745 13s. 2d.; total fine gold, 5,396.461 oz.; total value at 84s., £22,691 18s. 7d.; profit, £16,078 9s. 4d. The above profit includes the sum of £6,575 14s. 7d., being the premium on the January bullion.

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RAND WATER BOARD.

NOTICE No. 80.

VAAL RIVER SCHEME—CONTRACT No. 203.

TENDERS ARE HEREBY INVITED for:—

(A.) Supply, Delivery and Erection at the Board's Intake Pumping Station, Transvaal Bank of the Vaal River at Vereeniging, of:

(i.) Two Vertical Spindle Centrifugal Pumps, Direct Coupled to Electric Motors, with all Accessories, and

(ii.) One 10-ton Travelling Crane, erected.

(B.) Supply, Delivery and Erection, at the Main Pumping Station Site, Vereeniging, of two Horizontal Spindle Centrifugal Pumps, Direct-Coupled to Electric Motors, with all Accessories.

For particulars apply at the Office of the CHIEF ENGINEER, RAND WATER BOARD, where copies of the Contract Documents may be obtained on and after Wednesday, the 15th June, 1921, upon a deposit of £5 5s. per copy, which amount will be returned on receipt of the documents and a bona-fide tender. Additional copies of the documents may be obtained on payment of £1 1s. per copy, which amount will not be returned.

No Tender will be considered unless accompanied by the Deposit referred to in the Form of Tender.

The Board is not bound to accept the lowest or any Tender, and may, if it so desires, divide the Contract between two or more Contractors.

All Tenders are to be deposited at the Office of the Secretary, Rand Water Board, 2nd Floor, Central House, or P.O. Box 1703, Johannesburg, before 12 noon on Wednesday, the 28th September, 1921.

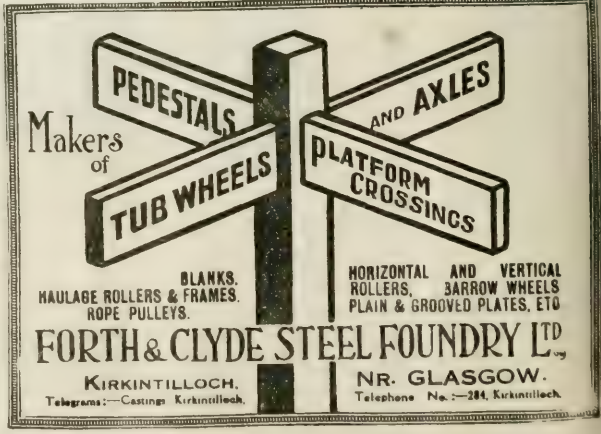
W. INGHAM, M.Inst.C.E., M.I. Mech.E.,
Chief Engineer.

Johannesburg Consolidated Investment Co., Ltd.

NOTICE IS HEREBY GIVEN that a Dividend of 10 per cent., free of Income Tax, has been declared payable to all shareholders registered in the books of the Company at the close of business on the 30th June, 1921, as soon as the necessary returns are received from the London Office.

The Transfer Books of the Company will be closed from the 1st to the 10th July, 1921, inclusive.

By Order of the Board,
W. H. MARDALL, Secretary.



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The "Mining Journal's" Essay Competition.

The enduring improvement which our mines require can only be obtained through the media of better efficiency and lower working costs and with a view to eliciting constructive views on these supremely vital subjects the *South African Mining and Engineering Journal* offers a prize of £25 for the best essay on the subject of "How to Improve Efficiency and Lower Working Costs in and on the Mines of the Witwatersrand."

Criticism should be constructive rather than destructive, but the assurance is given that no competitor will in any way be prejudiced in his employment by the submission of criticism of existing means or methods.

Essays containing libellous or malicious statements against any particular individual or individuals will not be considered.

TERMS OF THE COMPETITION.

The conditions of this competition are as under:

1. Essays must not exceed 2,500 words in length, and where new or suggested devices form an essential portion of the Essay, the contribution should be accompanied by diagrams clearly exhibiting the nature and functions of such device or devices.
2. Essays should be typewritten or written in easily legible handwriting on one side of the paper (preferably of foolscap size) only.
3. Each essay must state the full name and address of the author and if the author is an employee of a Mining Company operating in South Africa or has been an employee of such a company, his occupation and position should be stated.
4. Essays and diagrams (if any) must be addressed to the Editor, the *S.A. Mining and Engineering Journal*, Box 963, Johannesburg, and be marked "Competition" in the top left-hand corner of the containing envelope.
5. The competition closes on July 1st, 1921.
6. In the event of the Committee of Adjudication deciding that no essay submitted merits the award of £25, the Committee will have power to withhold the award of such a prize and to give in lieu thereof an amount which they consider proportionate to the value of the best article or articles submitted.
7. It shall be at the option of the Editor of the *S.A. Mining and Engineering Journal* to publish any essay or any portion of any essay submitted and to pay for such essay or portion thereof at the rate of £2 2s. per page according to the measure of pages in the *S.A. Mining and Engineering Journal*.
8. No correspondence can be entered into regarding this competition, and the Editor of the *S.A. Mining and Engineering Journal* will not hold himself responsible for the safe return of any manuscript submitted, but where a stamped and addressed envelope is forwarded with each contribution the Editor will, after adjudication, endeavour to return unsuccessful contributions.
9. A competitor may submit more than one contribution.
10. It is an express condition accepted by and binding upon all competitors that the decision of the Committee of Adjudication as constituted above or of any alternative adjudicators is final and absolute. Submission of manuscript will infer a full understanding of the acquiescence of the competitor in this and other conditions of the competition.
11. Essays may be written in either of the official languages.

Points for Competitors.

There are one or two matters in connection with this essay competition which we would like to bring to the notice of competitors.

In the first place it should be made clear that a good idea will not be debarred from winning the prize offered because the contribution fails from a literary point of view. Neither will brevity be a handicap. On the contrary we shall welcome briefly expressed ideas and suggestions provided that they contain some useful and new idea or some better application of an idea or device which is not new or novel.

A committee of well-known engineers connected with the mining industry has been appointed to adjudicate in conjunction with the Editor of this paper.

Mr. Isaac Hodges, General Manager of Vereeniging Estates (Cornelia and Camp Collieries) and one of our leading coal experts, is leaving this week for England on a brief visit. Mr. Hodges was formerly President of the Association of Colliery Managers of Great Britain, and many old friends of his will learn with interest that he is spending four months in England.

NOT ASSISTING THE MINERS' INQUIRY.

Witness Rebuked from the Chair.

The Chairman of the Mine Workers' Union Committee of Inquiry had occasion to remonstrate with two witnesses on Thursday for taking up an attitude which, it was considered, was not helpful to the inquiry.

One was Mr. Hildebrand (of the Fordsburg Strike Committee), to whom the Chairman, Mr. H. Day, pointed out that certain of his replies to questions were contradictory to his earlier statement.

"Don't you think," asked one member of the Committee, "that the men on this Committee have a certain amount of brains?"

"I do," was the reply.

And yourself as well?—I hope so.

"Well," said the member of the Committee, "I have known you several years, and don't you think it would take a pretty smart man to make a tool of you?"

The witness did.

This was in reference to the witness's inability to tell the Committee who handed him the letters which, as a delegate from the Fordsburg Strike Committee, he carried to Boksburg on the Sunday of the spreading of the strike.

Mr. Hildebrand could not remember who actually handed over the letters, but stated later that he had just recollected that it was Mr. Van der Walt who actually received them into his charge at the Fordsburg office.

The cross-examination of the witness proceeded till finally the Chairman pulled him up.

"When you came into this room," said Mr. Day, "I asked you if you intended to help the Committee, and you said: 'Yes, to the best of my ability.' But in the statements you are now making you are contradicting all your other statements. You give different answers to the same question in the same breath. This does not assist the Committee at all. We are here to get at the truth of the matter and shall sit until we do."

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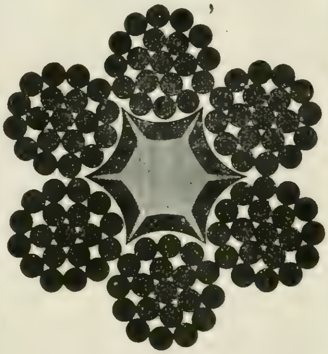

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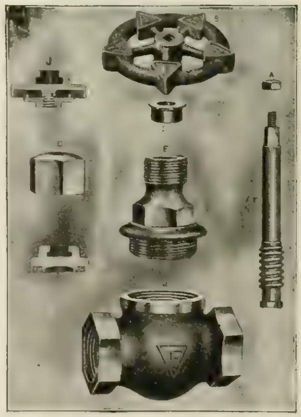

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

GENERAL POSITION—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—KILN SEASONING OF SOUTH AFRICAN WOODS ADVOCATED—ELECTRICAL GOODS—AMERICAN VIEWS: KEEP THE FARMERS PROSPEROUS—WAGE REDUCTIONS—BRITISH TRADE'S ENCOURAGING OUTLOOK—OILING STATIONS —METAL MARKET—BREVITIES.

General Position.

Disappointment is freely expressed in mining circles at the action of the Miners' Federation in turning down the proposals of the Chamber of Mines regarding reduced wages, and at the attitude of the coal miners in Britain in rejecting the owners' new terms, as shown by the recent miners' ballot. It is, however, thought that this three months' struggle must soon cease, as the miners are at the end of their financial tether. In the meantime Britain has lost her export coal trade, to mention only one result of the present disastrous dispute, which it will take her a very long time to recover. America is now exporting larger quantities of coal than ever before. Prices at Home are hardening for some commodities; linseed oils, for example, have risen quite recently as much as £15 per ton to about £40—£42 per ton. The tendency on the other side at the moment is undoubtedly for prices to harden, due principally to the fact that stocks, in consequence of the factories not turning out any considerable quantities during the past three months, are gradually being absorbed. A prominent merchant and a shrewd judge of market conditions is of opinion that we are now experiencing an upward curve in prices, which, however, is bound to react when once the coal struggle has been settled. Locally everybody seems to be intent upon the end of this stocktaking month of June, and there are at the moment no signs of the present inactivity in general business lifting. It is true that there are no particular reductions to record in prices generally, but, in the absence of any pronounced demand, prices have a downward tendency and, as an influential broker said, a buyer in the market to-day can pretty well make his own price. He thought, however, that we were now probably at the end of our troubles, and that the month of July, which marks the beginning of the financial year for many commercial houses and Government departments, etc., would show a better state of affairs, when such firms and Government departments, for a time at any rate, would be in a position to spend money more freely. In the meantime cutting of prices on the Commercial Exchange still continues, due to present large stocks on hand, for bolts, nuts, rivets, etc., it is difficult to get cost price; steel plates, naturally, have for some time past been sold at a loss.

Iron and Steel.

Business has been very dull this week, with little inquiry, in view of the stocktaking period and the natural desire of the mines to restrict their purchases to absolutely essential requirements. Latest nominal quotations: Dunswart, 29s.; Union Steel Corporation, Ltd., ordinary sized rounds, flats, and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 55s.; ⅜ in. iron, 40s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 52s. to 62s.; ¼ in. square iron, 60s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. to 62s. 6d ; channels and joists, 47s. to 48s.; imported angles, 45s. to 47s.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in., ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; drill steel, 7½d ; hollow, 1s 0½d.; wire nails, 42s. to 57s.; shovels, 60s. to 70s.; wheelbarrows, 70s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d. per 98 lb. coils; 24s. to 25s. per 68 lb. coils, large, 12 gauge, 28s. 6d. per 96 lb. coil; 14 gauge, 22s. 6d. per 66 lb. coil; plain wire, No. 8 galvanised, 35s., and black 32s. 6d. per 100 lb. coil.; fencing standards, 12, 14, and 16 lb., at 27s. 6d., 30s. and 32s. 6d. respectively per dozen; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb. Cast steel is ruling at Home at £50 per ton; mild steel at £19 per ton.

Orders for machinery and mining material generally along the Rand are very restricted just now and only actual requirements are being purchased. The mines to-day are buying second hand spares just as freely as they bought new in good times. Orders have been coming in from the coal mines and especially from the new companies which are starting work; many of these coal mines have been equipped with nothing else but second-hand machinery and materials from the Rand. There is an abundance of second-hand mining material to be got at very low prices to-day. Second-hand 16 lb. rails can be had in large quantities at about £18 per ton, compared with £24 per ton some three months ago. Loco type boilers were very scarce a few months ago, but to-day it is marvellous where they come from—they are unearthed somewhere the market is well stocked. As an instance of the fluctuations these boilers have undergone of recent months, it may be mentioned that a 25 horse-power boiler, 100 lbs. pressure, for which £550 was asked a few months back, can now be bought for about £400. Steel plates have come down considerably from about £32 10s. to £17 10s. per ton; in pre-War days these were selling new at £11 to £16 per ton.

In the iron and steel industries a somewhat more hopeful feeling prevails at Home. Prices for pig-iron are steady, as holders believe in higher prices shortly. Germany is threatening underselling in gas tubes at 40 to 50 per cent. below British quotations, also in steel billets delivered at £8 per ton, finished steel bars at £10 10s., and gas strip £12 10s.

The House of Representatives, Melbourne, has rejected the Labour proposal to increase the duties on pig-iron to 30s. per ton British preference, 45s. per ton intermediate tariff, and 65s. per ton general tariff. With regard to the pig-iron industry in Britain, before the coal strike pig iron cost £11 per ton to produce, the Belgian product being sold there at between £6 and £7 per ton. The cost of the necessary coke in the former case was 91s., showing the prohibitive cost of coal. With the general stoppage of the steel works in Britain owing to the coal strike, purchases from the Continent have increased at higher prices. Belgian billets are offered at £8 to £8 10s. Belgian finished bars are £11 delivered, as against £14 for British. Common Belgian iron for nuts and bolts is quoted at about £10.

Engineering Shops.

The report generally is that business is slowly but gradually improving, but there are no outstanding features to record.

Timber and Building Materials.

Business remains quiet in the absence of much building activity, and inquiries are small. Stocks are abundant. No recent large shipments have arrived from the Baltic, and some doubt exists whether shippers will reduce their present selling prices this season. 3 x 9 deals are 1s. 3½d. to 1s. 4d.; scantlings, 1s. 3d. to 1s. 4d.; beaver board, 5d.; oregon, 9s.; pitch pine, 9s. to 9s. 6d.; floorings, 8¼d. to 8½d.; ceilings, 5½d. to 6d.; corrugated iron, 24 gauge, 9½d. to 10d. Furniture timber: Japanese oak, 1 in. to 2 in., 1s. 8d. per sq. ft.; Burmah teak, 20s. to 21s.; American oak, 1 in. to 3 in., 1s. 6d. per super; American black walnut, 1 in. to 4 in., 1s. 7d. per super; West African mahogany, 1 in. upwards, 2s. 1d. to 2s. 3d. per super; 3-ply ash, 5 m.m., 10d. per super. Bricks are ruling at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; and £5 for pressed per 1,000 at yard; white lime, 7s.; unslaked, 7s. 6d.; building lime, 4s. 3d.; plaster lime, 5s. 3d.; cement, 11s. 6d. a bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 47s.; 3-ply, 55s. 3d.

Second-hand Iron and Timber Yards.

These continue inactive; business is very quiet at the moment; stocks are abundant. Iron is ruling at 6d. to 7d.; timber at 1s.; casements, 9s. to 25s.; mouldings from 2½d.

Building Trade Employers' Proposals for Lower Wages.

The Master Builders' Association has proposed the following to the Executive of the National Board of the Building Trade Employees regarding reduced wages and increased hours of working: (1) That a general all-round reduction in wages be made on a percentage basis of approximately 15 per cent. on the existing standard rates, which gives a reduction varying from 6d. to 7d. per hour throughout the Union, according to the district. The standard rates of pay, therefore, in the various centres will be: Cape Province and Maritzburg, 3s. per hour; Durban, North and South Coasts, 3s. 4d. per hour; Transvaal and Orange Free State, 3s. 8d. per hour. (2) That the 48-hour working week be reverted to in order to reduce the cost of production. (3) That in order to find work for the large number of painters now unemployed, where the painters' rate is the same as the other trades it should be reduced by 5d. per hour, or, alternatively, that the Unions should themselves provide an adequate grading scheme whereby painters could receive the ordinary flat rate and the lesser skilled the lower rates of pay. These proposals are now under consideration.

South African Woods.

Mr. Nils B. Eckbo, an eminent wood expert and officer in charge of timber investigations in the Forest Department, Pretoria, in the course of an interesting lecture at Pretoria, referred to the great advantages resulting from an efficient kiln seasoning of timber. The initial cost of a commercial kiln for the purpose would, he said, probably be between £1,000 and £2,000, and the cost per cubic foot of seasoned timber should not exceed 1s. at the most, and it might be brought down to 6d. according to local conditions. The cost in America amounted to 3d. per cubic foot. Experiments had been in operation in Pretoria since February last with different kinds of yellow wood from various parts of the country. The wood had been seasoned green from the saw in from two to four weeks, and it had been used by the railways for truck building, joinery, turnery and pattern-making, with very satisfactory results, and no shrinkage or warp had taken place since leaving the kiln. Mr. Eckbo said South Africa had over 2,000,000 acres of indigenous forests and plantations, from which were cut about 30 million cubic feet annually, at a market value of approximately £4,000,000. Our woods, he stated, were in disrepute generally, principally on account of unreliability in service, as was reflected in the current market prices, when yellow wood, for instance, retailed well below the par of poor unfirbed deal. This unreliability in service could be overcome through improved methods of seasoning, and when that was well established the present prejudice against our woods would soon disappear.

Electrical Goods.

Business remains slack in town and along the Reef and few country orders are coming in just now. The new electric lighting scheme for the Middelburg Municipality, the contractors for which are Messrs. Hubert Davies & Co., Ltd., is the cause of a few orders coming to hand for general accessories, a leading dealer having secured one at the beginning of this month amounting to some hundreds of pounds sterling, and expects a similar order at the end of June. This installation is expected to be completed in October next. Materials are arriving steadily and all lines are now well stocked. Prices remain unchanged locally, but latest Home advices report a hardening tendency. American wares are still out of the market on account of the adverse exchange. America is anxious to do business, but dealers here do not see their way to ordering under present exchange conditions. Germany is again exploiting electrical materials. A dealer in a large way of business made inquiry there in April regarding insulators, and got a reply this month that his order had been accepted and forwarded at a price 15 per cent below that ruling at the time of ordering, which means that this particular consignment of porcelain insulators will be landed here in Johannesburg at about half the cost of British quotations.

American Views.

A leading American importer states that no further reductions have occurred in any lines in iron and steel in America, and that in some lines there was a hardening tendency, perhaps not very much, but still an upward lift. Rubber prices seem to be a little higher; he had himself tried to get reductions, but without success. Cotton is a trifle firmer, about ¼d.; futures, four to six months, are very strong in America. From all indications the acreage in America will not exceed 30 per cent. to 40 per cent., which, if correct, is bound to cause cotton to rise. In this country the outlook for the second half year is slightly better than for the past three months—not a great deal better, but tending towards improvement. When the farmer has money to spend he will, he said, buy a windmill, a pump, a plough, or any of a hundred different articles useful to him. Had the Government not stopped the exportation of mealies last year there would, he said, to-day have been £5,000,000 ready money in this country to be circulated for the general benefit of the community. To-day there is little or no demand by the farmers for agricultural implements, etc. He mentioned in particular the case of barbed wire. A year ago the demand for it was so great that it was speedily cleared off the market; to-day, in the well-founded hope that some demand at any rate would continue, stocks had been ordered and there were now miles upon miles of barbed wire lying at the coast and here, and likely to continue to do so for some considerable time. When the farmer gets his crops in and sells them, although he will not get his former profit, he will still get a profit and have money to spend. The Union Government, he said, had to learn the lesson which the Canadian and American Governments had a long time ago learned and profited by, that first and foremost the Government must keep the farmer prosperous, and then we shall have prosperity throughout this country. He said that if we looked back during the past forty years we should find that when the farmers' prices were low general business conditions were not far removed from stagnation. Our Government must learn to keep the farmers prosperous, because they are the men to spend money and the cause of its being circulated throughout the country.

Wage Reductions.

The Johannesburg Municipal employees have accepted the 5 per cent. reduction in wages which automatically falls due under the Lucas award.

End of Cotton Strike.

It is satisfactory to learn that the Lancashire cotton dispute—the mills were closed down on June 4 following the failure of the owners and the operatives to reach a settlement —has been settled. The closing down of the mills affected half a million operatives. The terms of settlement have not yet been disclosed. It will be remembered that the owners proposed a reduction in wages of 5s., while the operatives insisted that the reduction should not be more than 2s. 6d.

Engineering Trades.

Negotiations between the Engineering Employers' Federation and the trade union representatives in regard to the proposed wages reduction are proceeding. A national stoppage is threatened when employers' notices of reduction in wages come into operation on July 1. Five and a half million workers are affected. The employers proposed reductions amounting to 3s. per week for time workers and 7½ per cent. for piece workers from June 16, similar cuts in July, and reductions of 12½ per cent. and 7 per cent. respectively in September. The workers are willing to accept the June and July reductions but not the September reduction.

Encouraging Outlook of British Trade.

The tendency is to improve. The coal stoppage has enabled stocks to be reduced and signs are not wanting that wholesale prices will advance. This is due not only to the lessened output in factories but as a result of the increasing purchasing power and the diminishing competitive selling power of European countries. Recently several inquiries and orders for substantial quantities of goods have been received in Britain from foreign markets.

Oiling Stations.

The Civil Lord of the Admiralty stated in the House of Commons that under the new programme coaling stations at Home and throughout the Empire are to be turned into oiling stations. The main Admiralty oil reserve at Home is to be completed in 1929, and there will be installations at the Cape, the Falkland Islands, Gibraltar, and other places in the Empire. The amount of nearly £1,000,000 for this purpose was granted without a division. The decision of the Admiralty in this respect confirms previous predictions that the fuel of the future is likely to be oil.

BREVITIES.

Gold Discovery in Canada.

A cable from Toronto says it is reported that gold has been discovered on the Cadobbe River, in the far north-west of Alberta. Reports concerning the strike of gold at Elbowlake, Manitoba, indicate that the largest body of ore on the continent has been discovered, which is said to be 350 feet long and 50 feet wide. The gold is said to be freely deposited. Prospectors are staking heavily.

Railway Rates in South-West Africa.

From July 1st next rates, fares and tariffs in force over the South-West African Railways are being revised and reduced. The revised tariffs will substantially reduce the rates for livestock, coal, grain, and other commodities between the Union and South-West Africa, thus helping the development and interchange of trade between the two territories.

Johannesburg Municipal Tramways.

The following is the traffic return for the week ended June 11, 1921 (figures for corresponding week for the previous year are given in brackets): Car miles run, 91,711 (84,372); total receipts, £10,808 (£8,884); average receipts per car mile, 28.28d. (25.27d.).

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ENGINEERING SECTION.

Electrification of Railways in South Africa.

Based, doubtless, on the report of Mr. F. W. Mills, the Chief Electrical Engineer of the S.A.R., the latest Bulletin of Sir Wm. Hoy contains a lengthy reference to the whole question of railway electrification. The daily papers have recently contained several references to the lessons to be learned from the Italian railways, but, as Mr. Mills has paid a visit to Italy recently, and doubtless gone carefully into conditions there, it seems only fair to await his detailed report on the merits of the system adopted before listening to the views of laymen. From Sir Wm. Hoy's Bulletin we take the following:—

Perhaps one of the most important effects of the war upon transportation development has been the impetus it has given to railway electrification.

The conversion of railways from steam to electric traction is in progress or in contemplation in most parts of the world to-day, due largely to the high cost of steam traction and the pressing need for economic operation.

Electrification, both in suburban and main line working, was being gradually extended prior to the war, but post-war problems have focussed attention upon the advantages of electrification and forced many countries, especially those depending upon outside sources for their coal supply, to embark upon electrification as an economic necessity.

The extent to which electrification has been adopted in other parts of the world and the schemes to which other countries are committed are not generally known and may be of interest.

In America a large number of electrification schemes have been completed, some of them involving considerable mileage: One section, 650 miles; one section, 531 miles; one section, 251 miles; one section, 250 miles, and numerous sections of 100 miles and over. Some of these sections have been in operation for a number of years. Two of the longer sections are mountain sections, one crossing the Rocky and the other the Cascade Mountains. The working results on all the larger schemes have been reported upon from time to time as highly satisfactory.

Lessons From Great Britain.

In Great Britain a considerable mileage of suburban lines has been electrified, as have also several main line sections. At present several large main line schemes are under consideration. The Lancashire and Yorkshire Railway has 111 miles of electric track, the London and South Western Railway 150 miles of electric track open and about 90 miles still to be undertaken, the North Eastern Railway 108 miles open, including a main line section, while two main line sections aggregating 111 miles have been provisionally sanctioned. The London and North Western Railway expect to have 63 miles in operation this year. There are about 369 route miles of electric railways in the United Kingdom, roughly 827 track miles.

The whole question of railway electrification was recently discussed at a meeting of the Institute of Transport on a paper read by Sir Philip Nash, Director-General of Traffic, Ministry of Transport. One or two of the remarks made at that meeting by well-known railwaymen may be of interest.

> "Sir Herbert Walker, who was Chairman, said, in support of the contention that the improved services under electric traction stimulate traffic, that while in 1915 the South-Western Railway carried under half a million passengers a week in the electrified area, they were to-day carrying over one million, and that though the cost of working by steam had increased by considerably over 200 per cent., the operating cost on the electrified system had only gone up by 100 per cent., this difference being due to a large extent to the concentration of the production of energy resulting in a considerable reduction in the number of men employed. . . .

Sir William Forbes, General Manager of the London, Brighton and South Coast Railway, said, inter alia:—

> "We put up a system which has been blessed with the name of "the clothes-prop line." I can only tell you that after twelve years' experience of that system I am perfectly content. The results have been extraordinary. Sir Herbert Walker has already stated how he has cleared in a short time an increase of over 100 per cent. on his traffic. On my small section of railway we had an increase of over 150 per cent. in traffic and over 200 per cent. in money. On the small capital—it was in those halcyon days when you could raise money and get your work done much more cheaply—on the capital we expended, we can show a return of over 15 per cent." . . . . and I can tell you on the capital required for this main line electrification we show in operation expenses, and this in varying detail which has been most carefully worked out by experts—a saving of from six to seven per cent., without regard to any additional traffic which we should most certainly secure. That is going in to Sir Philip Nash, and I hope he will present it to the Minister."

Sir Philip Dawson, Consulting Electrical Engineer to the London, Brighton and South Coast Railway, also spoke as follows:—

> "Companies have to pay handsomely on the capital invested, otherwise the schemes are not worth while considering. Gentlemen, on the question of railways, there can be no doubt that under certain given conditions, such as those on the main line to Brighton to which Sir William Forbes has referred, even at to-day's very heavy capital expenditure there will be excellent financial results.
>
> "If the capital estimates had to be drawn up again to-day there would be a very considerable and material reduction, and I think we should not be far out in suggesting that the return on the capital would be something in the neighbourhood of 20 per cent. Under these circumstances that capital ought to be found, and it will be of assistance to the general position of railways because of the increased traffic the extension will bring in"

Sir Philip Dawson added:

"It was found that the terminal capacity of Victoria and London Bridge stations by electrical adaptation could be increased by over 200 per cent."

Sir Vincent L. Raven, K.B.E., the Chief Mechanical Engineer to the North-Eastern Railway, speaking about the electrification of the Shildon mineral line, said:—

"But it is true to say that we are working traffic which would, and did, take thirteen steam locomotives, with five electric locomotives, and we are doing it most satisfactorily.

With regard to the maintenance cost of the electric locomtive, I unhesitatingly say it will cost in maintenance at least one-third of the steam locomotive, but of course you have not got the boiler and so forth to deal with.

One thing which strikes me as being very important in this consideration is the labour question of the future. I don't believe myself that you will be able to get wages down very much, if at all, and the consequence is you will have to endeavour to meet that by reducing the number of workmen required to deal with your traffic. You see what you can get out of the electric locomotive when you get five engines to do the work of thirteen, you see the great reduction in the work of enginemen's time there. You will do away with considerable shed staff. There will be no cleaning of boilers, no cleaning of ash-pans, and therefore you will be able to dispense with a large staff. I think that that is a most important feature, and if we are going to be able to get railway companies to pay in the future it will be through economy of this kind, by labour saving, and I am perfectly certain from my experience that it will have to be done in that direction.

Again, it seems to me that this question of capital can be looked upon in two ways. As Sir Philip Nash has said, the locomotives need not be put down to capital charge; they can be put down to renewals. The electric locomotive costs more than the steam, but it does not cost anythink like the proportion of the steam engine which you put out of use; so you can easily put that cost of the locomotive to revenue charges, and bearing in mind what I have said about coal, you would be able to put the equipment of the permanent way also to revenue charge. After all, it is really taking the place of the coal, and so I do not know that this question of capital cost, which is put so prominently forward, is one that we need be so frightened of."

Examples from the Continent.

In France a small mileage is being operated electrically. The Midi Company, which has 94 miles of double track under electric traction, is electrifying a further 1,862 miles of line. Sections of the Orleans and Paris, Lyons and Marseilles lines are also being electrified, in each case 1,862 miles of line having been taken in hand. As a result of a report by a Government Commission which visited America and other countries recently, 5,200 miles of steam railway are to be electrified over a period of ten years. The Minister of Public Works in France announced recently that in future no more concessions would be granted for steam railways and that electric railways only will be allowed. In Switzerland 622 route miles of private railway had been electrified up to August, 1919, and £3,000,000 has been spent on the electrification of the State lines. There were 32 route miles of State railway worked electrically in 1919, while over 300 route miles of State line and 25 miles of private line were then being converted to electric traction.

Italian Experience.

In Italy 300 route miles were being operated electrically up to April, 1920. The electrification of 26 miles was then in progress and the Government has perfected plans for the electrification of an additional 14,000 miles of State line and certain of the privately-owned systems. The project will involve an outlay of £32,000,000, and the time required to complete the work is estimated at 10 years. In Southern Italy the first line to be electrified will be the Foggia-Benevento, which crosses the Appenines and has heavy gradients and tunnels. In Northern Italy the first line to be converted is the Genoa-Pisa connecting Genoa, the Riviera and Central Italy. Next will come the lines connecting Bologna and Florence over the Appenines. It is expected that electrification will enable passenger trains to be run at a speed of 47 miles per hour with the exception of a few sections, over which the speed will be 31 miles per hour. Electric traction has given highly satisfactory results in Italy, particularly on the lines crossing the mountains.

Some Other Places.

In Japan 6,349 miles are to be electrified, the work to be carried out in sections. A private railway there 108 miles in length, is already worked electrically. In Austria, not despite, but on account of financial difficulties, 61 per cent. of the total mileage is to be electrified. A programme of 400 route miles has been started, to be completed by the end of June, 1925. It is reported that the electrification of all trunk railways in Germany has been decided upon, the work to be carried out by progressive stages. One hundred and nine miles of line are now being electrified, and several lines are in operation worked by electric traction. The Belgian main line system is to be electrified in three phases. A commencement will be made with the Brussels-Antwerp section and thereafter the Luxemburg and Ourthe line. In Holland proposals are on foot for the complete electrification of the steam railways. In Cuba 80 track miles of railway are to be electrified; 16½ miles are already being worked under electric traction. In Spain several electric railways (one a 74-mile section) are in operation, and a large electrification scheme is now under consideration. In Sweden there is an 81-mile section in operation, and a commencement has been made with the electrification of the whole of the Swedish railway system (9,300 miles) to be undertaken over a period of years, the Stockholm-Gothenburg line being the first to be started. In Norway a 33-mile section of the State Railways is being electrified, the work to be completed next year. A private line 29 miles long has already been electrified. Finland is considering proposals for the electrification of its State Railways, and Poland for the electrification of the main lines, while proposals have been submitted for the electrification of the railways of Mauritius and Jamaica. India has proposals under consideration, while in Brazil private companies have main line electrification work in progress, and the State has also electrification schemes in hand. The Chilean Government has called for tenders for the electrification of the railway from Valparaiso to Santiago. In Australia the electrification of the suburban lines in and around Melbourne is nearing completion, while several sections in New South Wales are also being electrified. The electrification of the Melbourne suburban railways is reported upon officially as a complete success financially and otherwise. As in other places where electric traction has been installed, traffic has developed enormously since the electric trains were started. New Zealand is electrifying a short mountain section.

SUCCESSFUL BRITISH TRACTORS.

The merits of the British-made tractor for agricultural purposes were conclusively demonstrated during a trial on a rubber estate in the Far East. All conditions were against success. The soil consisted of heavy sand or of sand mixed with clay, and rain had fallen heavily prior to the trial. Nevertheless the driver was able to turn and manoeuvre with the greatest ease. Further, the tractor showed its hauling powers by pulling two large trucks, weighing about 11 tons, up hill.

Mine Engineers as Mine Managers.

An interesting discussion took place at a recent meeting of the S.A. Institution of Engineers.

Mr. S. E. Boult moved the following resolution standing in his name, previous notice of which had been duly given, viz.:—" That this Institution approach the Government Mining Engineer with a view to making the following addition to No. 297 of the Government Mining Regulations: ' That every holder of a Government Certificate of Competency as a mechanical or electrical engineer endorsed for mining machinery, who has had control of both the underground and surface plant of a mine for a period of five years, shall be qualified to sit for the mine manager's examination.' "

Mr. J. Q. Braidwood seconded the motion.

Mr. S. E. Boult, speaking in support of his resolution, said he would like to express his personal thanks to the Council for allowing the matter to be brought up for general discussion at that meeting. The subject was one which was full of interest to a large number of members of the Institution, and particularly those who had realised that engineering on a mine was at present more or less of a dead-end occupation, which, he thought, was quite wrong when one came to consider the importance of engineering in mining. The Government held the door open to promotion to all who worked underground, no matter in what capacity, excepting to those connected with engineering, merely stipulating that they must have had practical experience in mines for a period of two and one-half years.

It could be truly be said that the *application* of electrical and mechanical engineering formed the backbone of every mining operation, yet the engineer on a mine might spend the rest of his life trying to improve matters underground, might even go down the mine daily, but this was of no avail whatever in his gaining the qualification at present required by the Government to sit for the mine manager's examination. To enable him to do so he must throw up his hardly won position and work underground for eighteen months.

To be a mine surveyor, for example, was one of the shortest and most direct routes to mine management, and the point to be brought out and emphasised was that the mine surveyor's work was considered to be more onerous than that of the engineer, who went underground and supervised the erection of an engine, pump or fan or any other appliances for winning and handling minerals; this *work was not recognised as practical experience in mines!*

In endeavouring to look at the matter from a broad, unbiassed point of view, nobody could deny that the engineer was an absolutely indispensable unit on a mine, both on the surface and underground—just as essential in fact as the surveyor and the miner; then why not extend to him the same privileges of advancement that the latter enjoy, providing he obtained the general knowledge of mining requirements, which he had the opportunity of doing if he had control of the underground and surface plant of a mine for a period of five years?

The pure mining man must not forget that his stepping-stone to success is engineering; he must pick it up by some means or another, and the secret of mine management does not, as he frequently thinks, depend entirely upon the art of breaking rock, which impression often led to so much unnecessary friction between the mining and engineering departments.

Give the engineer a chance of mine management. It was his due by virtue of his being such an important unit; if he was unsuited for it he would automatically fall out, thus following the natural law of the survival of the fittest.

The Chairman said they were all very glad to have the resolution brought forward. The question before them, as presented in the resolution, was one that most engineers had been thinking about for many years. It had, in fact, been always the ambition of the engineer, no matter what particular branch or calling he happened to be in, whether mining industry or marine service, to get to the top. He knew of many who having spent a portion of their time at sea, thought it was time to leave because they would not become captains of their ships. Unfortunately, however, when they came on shore they found themselves confronted with the same barrier to ambition, and in getting on to a mine they ascertained there was a bar in so far as management was concerned. Although the resolution had his entire sympathy, he felt bound to say that they must recognise of course that a great deal of experience was necessary, apart from that of purely mechanical engineering, to render a man fit to carry out the duties of a mine manager. In these days the manager should be a highly qualified business man.

He would like to see the average engineer afforded the opportunity of presenting himself for examination, but the mere passing of the examination did not mean that the man was fit for the job of mine manager, and even if he were, the great difficulty remained of securing an appointment.

Mr. Kenneth Austin, in supporting the resolution, said that every engineer of experience and ambition must be agreed on the proposition indicated in the resolution. He agreed with all the Chairman had said, excepting as regards the inference to be drawn in connection with the position of the man who had succeeded in obtaining a certificate of competency as an engineer. It was quite true that he might not be able to step all at once into the position of a mine manager, but at least he might hope to succeed in obtaining some of those important positions which lay immediately under the management, with possibilities of succession to the higher position.

The Chairman had referred to the fact that business acumen was required for dealing with business matters connected with a mine manager's position. Engineers were fully qualified in this respect, but they wanted an outlet for their sterling abilities and common sense, without which no mine could satisfactorily be worked. He submitted that they were entitled as engineers to be placed on an equivalent footing to engineers on mines in other parts of the Empire. He failed to see why a good resident engineer should not make a good manager, and he thought the time had arrived when they should make representations with a view to having the law amended as suggested in the resolution.

The Resolution was then put to the meeting, and was carried unanimously, and ordered to be forwarded to the Government Mining Engineer.

STETHOSCOPE IN WORKSHOPS.

Most of us are, unfortunately, more or less familiar with the stethoscope, which the doctor uses when listening for the signs of defective action in our lungs or heart. It is not so widely known that the same kind of instrument can be employed to detect abnormal noises in moving machinery. The latest development is this workshop stethescope, due to a British engineer, lies in the use of a kind of telephone receiver in place of the stethescope rod. The advantage of this device is that every bearing and every gear in a factory can be fitted permanently with a receiver and all the receivers can be connected by electric wires to a single board in the manager's office or any other convenient spot. By means of suitable switches the manager can examine each bearing or gear in succession without moving from the board. Since abnormal internal noise is often the first sign of trouble which may lead to breakdown, this simple and rapid means of detection is an invaluable aid to the factory owner.

A PORTABLE PETROL DRIVEN CRANE.

Steam and electricity have hitherto been the chief means of driving cranes of a size larger than could be operated by hand, but the compactness and the convenience of the petrol engine have led recently to its application to cranes of the lighter grades. A good example of this new type is a portable crane developed by a British firm mainly for use in building operations. It is driven by a two-cylinder petrol engine and is made in two sizes, one capable of lifting half a ton and the other with a capacity of one ton. An important feature of this crane is the special gear which enables the driver, simply by moving a control handle, to lift a load at any speed from a crawl to the maximum, while the engine runs continuously at its most efficient speed. If for any reason the handle is released the brake is automatically applied on the instant and the crane comes to rest with the load suspended. The engine acts as a counterweight and the whole equipment is so light and well-balanced that it can be easily moved about on its four wheels or slewed as desired.

MAMMOTH BRITISH GAS ENGINES.

Although the first gas engines were built in Great Britain, that country did not, owing mainly to concentration on the steam turbine, devote much attention to very large sizes of gas engine. Lately, however, more than one British firm has equipped itself to supply the mammoth gas engine used to provide the blast for blast-furnaces in ironworks. These engines are driven by the gas given off by the blast-furnaces themselves. During the last few years one British firm has supplied large gas engines with a total of about 20,000 horse-power. One of the latest in this group is a blowing engine of 1,300 horse-power, and others, of still larger size, are in use for generating electricity.

A RAPID STONE-CUTTER.

Machines for cutting marble and other stone have a pedigree stretching back to very early days in civilisation, and they still often bear the marks of their primitive ancestry. Recently, however, a British engineering firm introduced a type which more closely resembles a machine tool than the crude equipments with which our forefathers were content. It is intended mainly for cutting and moulding, but it may be used also for slab and block work. The stone to be cut is placed on a table surmounted by a saddle carrying a carborundum wheel or a "diamond saw," which runs at 1,200 revolutions per minute and is kept cool by streams of water. A diamond saw is built up by arranging individual diamonds in metal "saddles" on the rim of a disc. Each saddle is drilled from behind, the diamond inserted in the hole and electrically welded over, and then mounted on the rim. The metal covering the diamond is ground away, leaving the diamond exposed. Wheels of this type make very rapid and efficient cutters of stone, and the use of the machine is expected to lead to remarkable economies over the older methods.

SOMETHING NEW IN WINDMILLS.

Many attempts have been made to solve the problem of efficiently utilising the winds as a means of generating electricity. The difficulties arise from the extreme variations in the force of the wind and from the liability, even in windy regions, to periods of calm during which no power at all can be obtained. These conditions suggest that wind power should be used only as an auxiliary to some other source of energy, such as the burning of coal or oil. Now that fuel of all sorts has multiplied in price, there is all the more reason for considering the possibility of turning the wind to account. Hitherto the usual plan has been to use a large slow-speed windmill to drive a dynamo at a high speed through gearing—a rather wasteful arrangement. During the War, however, there was in Great Britain a remarkable development in the design and construction of small high-speed dynamos on aeroplanes. These dynamos were direct-coupled to propellers, or rather "impellers," driven by the wind created by the aeroplane in flight. A British firm has devised a scheme for fitting three or more of these wind dynamos on the swivelling top of a vertical pole, with a vane to keep them in position against the wind. Each equipment gives 60 watts, and the arrangement forms a cheap and efficient auxiliary to the ordinary country-house lighting installation. The energy produced is, of course, stored in accumulators in the usual way. The operation of the plant is entirely automatic and it is so light and simple that it presents no obstacles in erection and maintenance.

THE BRITISH INSTITUTE OF PHYSICS.

The first scientific institutions in the world were formed in Great Britain; and to-day almost every branch of science is represented by a powerful body of British experts. The increasing specialisation of scientific work has led during late years to a rapid multiplication of such bodies, the latest to be formed being the Institute of Physics recently inaugurated in London. One of the main objects of the Institute will be to afford increased assistance to research in pure science. Great Britain has always been pre-eminent in this branch of progress and it has achieved results of epoch-making importance at a wonderfully small outlay. With improved organisation and increased resources it is expected that Britain's lead in the advancement of knowledge of the constitution of matter will be increased.

INSPECTING CLOSED BOXES BY X-RAYS.

X-rays are a form of light which has the power of penetrating substances which are opaque to ordinary light. The more dense the substance the less it is penetrated, so that the rays falling on a composite body, such as a box with metal nails and hinges, throws a kind of shadow picture of the hidden parts on a photographic screen. This fact has been utilised in the examination of manufactured articles. Recently a British Government Department brought out a portable X-ray outfit for examining large numbers of boxes, without opening them, in order to see whether they contained all the essential parts. The apparatus is placed on wheels and is solidly built to stand rough use in the workshop. In place of a photographic plate a fluorescent screen is used so that the operator can actually see the shadow picture thrown by the contents of the boxes. By the use of this equipment an immense amount of time has been saved in the inspection of thousands of articles.

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New Patents.

507. Lercester Phillip Dardes. Improvement in the treatment of diamond bearing material for recovering the diamonds therefrom.

508. George Haywood Lloyd.—Improvements in diamond washing machines, also applicable to ore concentrators and the like.

520. Mary Olive Oranston.—Improvements in re-inforced concrete for the manufacture of a re-inforced concrete combined pigsty, and waste pack mine pole.

521. Mary Olive Oranston. Improvements in the re-inforced concrete for manufacturing railway sleepers.

524. William Edwin Bleloch and Harry August Stockman.—Improvements in machines or apparatus for crushing or reducing minerals, ores and other materials.

527. Nelson Woodthorpe Graham.—Improvements in shovels.

533. Arnold Redler, Flour Mills, Sharpners, County of Gloucester, England.—Improvements in or relating to conveyors for substances in a fine or loose state of division.

534. Arthur Edwin Francis Dinglos and Henry James Carter, P.O. Box 3146, Johannesburg.—Improvements in means for moulding pipes or other articles in concrete and other plastic materials.

537. J. Hamilton Arstrather Macadam, c/o P.O. Box 3146, Johannesburg.—Improvements in lock nuts or means for locking nuts on bolts or the like.

538. John Russel Cawthorne, Box 2, Benoni, Transvaal. Improvements in regulating the underflow of classifiers, de-watering cones and the like.

539. Ernest Scholtz, 124, Grey St. East, Melbourne, State of Victoria, Australia.—Improvements in and relating to resilient wheels.

540. David Richard Lyngman and Francis Daniel Janssen I., Kungsgaten 9a, (2) Bargatan, 60, Gothenberg, Sweden.—Devices for lowering boats from ships.

542. Percy Cook and Alexander Bruce, Fire Station, Box 825, Pretoria.—Auxiliary automatic air valve.

MAY COMPANY REGISTRATIONS.

6746. Alberton Bioscope Co., Ltd., Town Hall, Second Street, Alberton; date of registration, 3/5/21; £400; private company.

6747. Pater, Ltd., 101, Fox Street, Johannesburg; date of registration, 3/5/21; capital £500; private company.

6748. The Real Estate and Trust Corporation, Ltd., 2-6, Estate Buildings, Fox Street, Johannesburg; date of registration, 3/5/21; capital, £1,000; private company.

6749. African Brick Company, Ltd., 4, Sidney Buildings, corner Pretorius and St. Andries Streets, Pretoria; date of registration, 4/5/21; capital, £5,000; private company.

6750. Commercial Agency and Trade Protection Association Ltd., Stella Buildings, Rissik Street, Johannesburg; date of registration, 4/5/21; capital, £600; private company.

6752. The Universal Enterprises, Ltd., 16, Trust Buildings, 98 Fox Street, Johannesburg; date of registration 4/5/21; capital, £750; private company.

6753. Coyne, Ltd., Rothsay Buildings (opposite Hotel Cecil), Rothsay Street, Benoni; date of registration, 9/5/21; capital, £200; private company.

6754. The Toric Optical Co., Ltd., Blinman's Buildings, Kerk Street, Johannesburg; date of registration, [illegible] 21; capital, £1,000; private company.

6755. Meat Producers Exchange, Ltd., 7 and 8, Glencairn Buildings, Joubert Street, Johannesburg; date of registration, 9/5/21; capital, £1,000.

6756. Maypole Dairies, Ltd., 5, Bell's Buildings, Main and Harrison Streets, Johannesgurg; date of registration, 11/5/21; capital, £2,000; private company.

6757. Symons Trust, Ltd., 57 Exploration Buildings, Commissioner Street, Johannesburg; date of registration, 11/5/21; capital, £300; private company.

6758. Der Deutsch-Afrikaner, Beperk, 268, Pretorius Street, Pretoria; date of registration, 11/5/21; capital, £2,100.

6759. The French Hairdressing Saloon, Ltd., Old Arcade, 100, Market Street, Johannesburg; date of registration, 11/5/21; capital, £7,000; private company.

6761. R. G. Hammersley & Sons (Africa), Ltd., Beresford Buildings, corner Main and Simmonds Streets, Johannesburg; date of registration, 14/5/21; capital, £500; private company.

6762. Hollins & Co., Ltd., 41, Upper Page Street, New Doornfontein, Johannesburg; date of registration, 14/5/21; capital, £35,000; private company.

6763. The African Salt Works, Ltd., 298, Commissioner Street, Johannesburg; date of registration, 14/5/21; capital, £300; private company.

6764. The Congo Equatorial African Trading Co., Ltd., Sterling Buildings, Ockerse Street, Krugersdorp; date of registration, 20/5/21; capital, £1,500; private company.

6766. Union Securities, Ltd., 158, 159, and 160 Exploration Buildings, Commissioner Street, Johannesburg; date of registration, 20/5/21; capital, £1,000; private company.

6767. Brits Trading Co., Ltd., 158, 159, and 160, Exploration Buildings, Commissioner Street, Johannesburg; date of registration, 20/5/21; capital, £7,000; private company.

6768. Kingsley & Marais, Ltd., 481, Curch Street East, Pretoria; date of registration, 20/5/21; capital, £2,500; private company.

6769. M. C. Joubert & Co., Ltd., 1, Bureau Street, Pretoria; date of registration, 20/5/21; capital, £2,000; private company.

6770. Robins Conveyors (South Africa), Ltd., 1st Floor, National Bank Buildings, Simmonds Street, Johannesburg; date of registration, 20/5/21; capital, £1,000; private company.

6771. Meyersohn Bros., Ltd., 227, Main Street, Johannesburg; date registration, 20/5/21; capital, £500; private company.

6772. Leeuwdoorns Trading Co., Ltd., Leeuwdoornsstad, Transvaal; date of registration, 21/5/21; capital, £600; private company.

6773. Margau & Co., Ltd., 55, Smal Street, Johannesburg; date of registration, 21/5/21; capital, £100; private company.

6774. C. O. Thienhaus & Co., Ltd., 26 and 27, Sanderson's Buildings, President Street, Johannesburg; date of registration, 21/5/21; capital, £60,000; private company.

6775. Wilson & Dugmore, Ltd., 31-39, Meischke's Buildings, Harrison Street, Johannesburg; date of registration, 27/5/21; capital, £6,000; private company.

6776. Walker & Snashall, Ltd., 17, Simmonds Street, Johannesburg; date of registration, 27/5/21; capital, £6,000; private company.

6777. Farrell's Estate Agency, Ltd., 88a, Fox Street, corner Harrison Street, Johannesburg; date of registration, 27/5/21; capital, £1,150; private company.

6778. The Goldfields Fresh Meat Supply, Ltd., 213, President Street, Johannesburg, date of registration, 27/5/21; capital, £2,000; private company.

6779. Austen & Co., Ltd., 10 Knox Street, Germiston; date of registration, 27/5/21; capital, £200; private company.

6780. Derand, Ltd., 7b, Consolidated Buildings, Harrison Street, Johannesburg; date of registration, 28/5/21; capital, £7,500; private company.

FOREIGN COMPANIES.

6751. Burnside Central Colliery, Ltd., C/o Frank Hall, Consolidated Buildings, corner Fox and Harrison Streets, Johannesburg; date of registration, 4/5/21; capital, £100,000.

6760. The Francois Cementation Co., Ltd., C/o C. L. Andersson, 31-9, Meischke's Buildings, Harrison Street, Johannesburg; date of registration, 11/5/21; capital, £750,000.

6765. The South African Advertising Contractors, Ltd., C/o William Redford, Aegis Buildings, Loveday Street, Johannesburg; date of registration, 20/5/21; capital, £2,000.

The following companies have been placed in liquidation:—

6418. Parisian Modiste, Ltd.; capital, £1,000.

4605. Produce Exports, Ltd.; capital, £15,000.

6120. Du Toit & Deetlefs, Ltd.; capital, £4,000.

1145. Johannesburg Forest and Land Co., Ltd.; capital, £50,000.

4563. M. E. Furniss, Ltd.; capital, £1,000.

4714. A.B.C. Syndicate, Ltd.; capital, £2,150.

6544. International Cabinet and Joinery Works, Ltd.; capital, £2,000.

4134. J. N. Theron Khun & Co., Ltd.; capital, £2,500.

5887. Sullivan Conservatorium of Music (Far East), Ltd.; capital, £15,000.

6162. Irish Bacon Co., Ltd.; capital, £10,000.

5204. Dangor, Ltd.; capital, £5,000.

6032. The African Trading Corporation, Ltd.; capital, £3,000.

4574. The Station Colliery, Ltd.; capital, £95,000.

READ "THE LAND WITHOUT A LEADER" in this Issue.

The South African
Mining & Engineering Journal
THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.
Established 1891.

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THE MODDER DEEP; A NEW PHOTO.

A view of one of our most prosperous Mining Propositions set in the heart of the Far East Rand. Unfortunately we possess few Modder Deeps, and in the House of Assembly during the past week there has been much debate on the present plight of the Rand as a whole. We deal with these speeches in an editorial contained in this issue. The state of affairs prevailing on the Rand and in South Africa generally is also examined in a long and important article which commences on the next page.

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THE LAND WITHOUT A LEADER.

WHY SOUTH AFRICA IS GOING BACKWARDS—WANTED: THE SPIRIT OF RHODES—GOVERNMENT AND INDUSTRY WITHOUT A LEADER—SMUTS THE IDEALIST—RHODES THE MAN OF ACTION—BEIT THE PHILANTHROPIST WHO CAUGHT SOME OF THE DIVINE FIRE—OUR PRESENT MAGNATES—BIRDS OF PASSAGE AND JOHANNESBURG—A MONUMENT OF INGRATITUDE—BEIT WHO WORKED FOR ENGLAND "NOR ROSE A NEW-MADE KNIGHT"—ROUILLARD OF THE GREAT IDEAS AND SCHLESINGER THE ASTUTE MAN OF BUSINESS—HOW OUR CABINET COULD BE IMPROVED—THE BLIGHT OF GOVERNMENT BY ORATORY—MEN WHO WOULD RIDE ROUGHSHOD OVER OLD PREJUDICES AND BANEFUL INTERESTS—THE PLIGHT OF THE MINES—WAILS AND THRENODIES BUT NO CONSTRUCTIVE POLICY—MISTAKES OF THE CHAMBER—ANNO DOMINI AND DESK-BOUND ROUTINE—SOME CONSTRUCTIVE CRITICISM—IMMIGRATION AND A PARTNERSHIP WITH RHODESIA.

Why is it that South Africa, which is admittedly one of the most richly mineralised and fertile countries in the world, with a magnificent climate and abundance of cheap labour, is in such straitened circumstances to-day?

Why is it that this sub-continent of ours which is so fortunately endowed by Nature, and which largely through its fortunate geographical position was enabled to keep outside the maelstrom of the recent great conflict which has shaken the old world to its very foundations, is in such a state of penury to-day? On all sides one hears tales of distress. The Government is without funds to carry on the proper development of the country, our white population is only increasing at a snail's pace except in the most unprogressive areas, railway revenue is declining even below the level of the well pared estimates, the mining industry is in jeopardy, farmers are financially embarrassed, bank deposits have declined by seventeen and three-quarter millions sterling in the last twelve months, and the grim spectre of unemployment grows with alarming rapidity in our midst.

Cecil John Rhodes, the maker of modern South Africa. A Master Mind, for whose spirit of progress the country yearns to-day.

We may measure the slowness of our progress by the sure test of population which is afforded in the statistics of the recently-completed census.

The area of the Union is 473,000 square miles, and the European population, according to the census just taken, is 1,523,424. This is an increase of only 73,331 on the census of three years ago, and the density of our population works out at no more than 3.2.

We have none of the frozen solitudes of Canada, and little of the never-never land of the desert interior of Australia. But whilst the increase of the white population of the Union in the ten years 1910-20 was 248,359 and for the years 1918-21 the increase was 73,331, the Australian population increased for the ten years by 970,000, bringing the total to 5,420,000, and for the same period Canada settled 250,000 newcomers on homestead holdings alone, the land occupied being 40,000,000 acres. Yet in South Africa to-day, with its vast undeveloped resources, nearly 10 per cent. of the small white population is out of work.

General Jan Smuts, Prime Minister of the Union, for whose courageous loyalty the Empire will ever be grateful. A brilliant intellect, an idealist and a great statesman, who lacks the personality to attract big men of business which Mr. Rhodes possessed.

The Burning Question.

In the face of these undisputed facts every citizen of the Union must recently often have asked himself the questions with which the article commences. The usual answer that is given to such queries is that South Afriac is but passing through the same period of depression which has assailed and is assailing the whole war-shocked world. There is admittedly a great deal of truth in this, but the answer is not satisfying. It does not give the whole truth or anything like the whole truth.

The fact is that not only did South Africa feel the baneful effects of the Great War far less than any other important country of the world; South Africa in reality benefited very substantially by the War and the War's consequences in a financial sense through sales of her products at War prices, and by the acquisition of the mandate for the South-West protectorate (which, although it may be a liability at present, is an asset of immense potential value), and particularly through the inglorious East African campaign, which the Imperial Government paid for whilst the Union secured the greater portion of the financial spoils.

With our much-desired gold and coal products and all our other vast resources, and many other advantages, the Union, better than any other country on earth, should have been able to weather the storm of the post-war period. We should, in fact, be positively prosperous. But, on the contrary, we are going downhill fast, and one may, therefore, well ask why our industries are declining and our coffers are empty.

The answer is simply this, that South Africa is without a leader.

Sir Lionel Phillips, head of the great Corner House. A man of restless energy, ability, and ambition, Sir Lionel has, it is supposed, amassed a magnificent fortune, and it is regretted that he does not spend more time in the land which has served him so well

The League of Dreams.

We have, it is true, in General Smuts one of the greatest intellects of the day, an enlightened statesman, and one to whom the British Empire owes a vast debt of gratitude for his courageous loyalty and tactful ability. But Smuts, skilful diplomatist though he be, is not the progressive, far-seeing industrial politician of which this country is in such dire need. The Prime Minister is a dreamer and an idealist, a great thinker in terms of nations, a tremendous actor on the stage of world peace, and the greatest philosopher of the Continent. Woodrow Wilson was another such idealist, and a sceptical world has scorned him. Smuts is more practical than his late colleague in the establishment of the League of Dreams. But much as we all admire him, and though few will disagree with the view that Jan Smuts and no other man can hold the reins of Government in this country of conflicting elements, it must be admitted that Smuts has yet to prove himself as a statesman of big constructive and business policies. His latest speech in London on the shifting of the World Drama to the Pacific is hailed as a masterly peroration, but the Pacific is beyond the range of our own practical politics and pressing problems. We need a leader whose eyes are not set on the ends of the earth, but upon our own farms and mines, and our national livelihood.

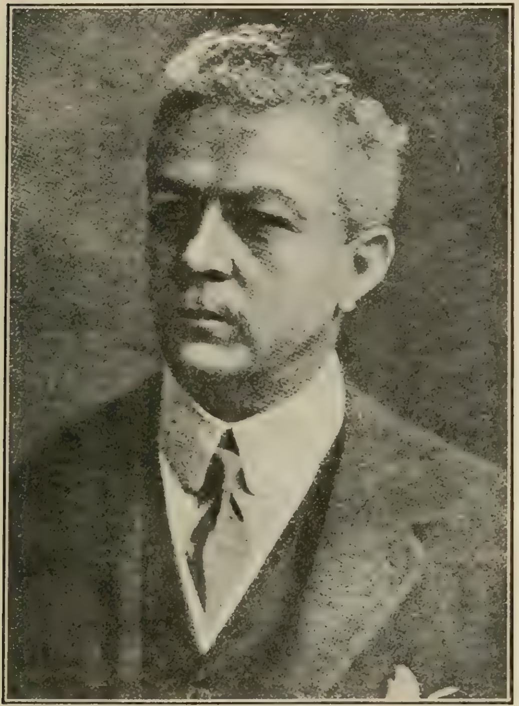
A Barren Session.

Four and a half months have elapsed since the last fateful election contest was fought, and so far we have observed no evidence of the consummation of any of the many big industrial schemes of which the Premier said so much on the eve of the polls. In the first Parliamentary session of the new Government not a single piece of large constructive legislation which will tend to the prosperity of the country has been passed. The whole attitude of the Government is typified in the declaration of impotence uttered by our Minister for Finance, who in the debate on the Land Bank Bill during the week asserted, " I don't know what to do!" Grand and inspiring words these! Fine slogan for the people of the richest country on earth! And in this connection we may recall the fact that only a few months ago the Government deliberately frightened away capital which was forthcoming for a new mining enterprise.

The Prime Minister is now in Europe, and it is understood that, in addition to attending the Imperial Conference, one of the objects of his visit is to secure money for the development of the country. It is ardently to be hoped that he will succeed in his mission, but Smuts hardly impresses one as a statesman with a hard head for business. He is too much in the clouds of idealism, and his altruism is such that he has not, unfortunately for South Africa, attracted or commanded the far-seeing financiers and shrewd men of business, without whom no young country can progress. And therein Smuts differs vastly from Rhodes. To both men belongs the dignity of great ideals. But whereas Rhodes thought in terms of a Continent and of the practical means of exploiting that Continent, our present Prime Minister's ability and conception is all absorbed in abstract problems of erring humanity.

Rhodes the Lodestone of Business Men.

Cecil John Rhodes has often been described as a great financier and a great man of business. This is nonsense. It is to misjudge a man of Mr. Rhodes' qualities to pretend that he was anything of the kind. True, he devoted his abilities, controlling and forcing them, in the earliest years of his manhood, to making sufficient competence to give him a sound starting-point. In doing this, he did what most forceful Englishmen are capable of doing. What Mr. Rhodes possessed was the unerring intuition which led him to perceive where money was to be made, and the magnetic force to draw the men to him who could make it. Consequently, he made a magnificent fortune. But he made it as the associate of men who had the insight to perceive that he was a great motive force in the political world; a force so potent that he might be counted upon to give stability and the sanction of a national, in contradistinction to a purely commercial, aim to the great financial enterprises in which they were concerned. They knew that Rhodes desired wealth in order to make possible the far-reaching political schemes to which he had dedicated his life. The triumph of his ambitions, ends in themselves so far as he was concerned, ministered to their ambitions. It is not suggested that there was anything underhanded in this strange partnership. It is all a question of aim; all a question of the point of view. Mr. Barnato, shrewd man of business and, in a limited sense, of affairs that he was, but caring no more about the British Empire than a village pump cares about it, was one of the earliest to perceive that Mr. Rhodes included himself, when he laid it down as a general proposition that every man had his price. He saw that the De Beers amalgamation scheme would be hopelessly shipwrecked unless it was weighted with a considerable tribute to the scheme upon which Rhodes had set his heart—keeping open the road to the north. Like a sensible man he paid Rhodes his price. So, from beginning to end, or rather after the earliest stages of his career, Cecil Rhodes was paid his price. He made a fortune, but to repeat the platitude—the obvious fact—that he cared nothing for it from a sordid or from any material, in a personal sense, point of view, is little short of gratuitous impertinence. The men who permitted him to grow rich served their turn. They were business men, and made use of the material at their hands, as they had a perfect right to do. This general statement admits, of course, of exceptions. Some of Mr. Rhodes' financial associates shared his larger ambitions, catching the divine fire from contact with him, or coming to share it out of pure friendship for, and admiration of, the great man with whom fate had linked them. But that Mr. Rhodes was in any way a great financier, a hundred public and private declarations of his own would be sufficient to disprove. The minute detaisl necessary to successful financial operations were distasteful, not to say abhorrent, to him. Throughout his life, from his schooldays upwards, he was a poor arithmetician. Clearly he owed his fortune to the genius of his friends, whom he knew better than any man how to choose. His own genius lay in a very different direction. Smuts, too, has a genius of his own, but unlike Rhodes he has not commanded the big men of business and kneaded them as the clay of his ambitions.



Sir Abe Bailey, versatile Financier, Politician, Farmer, and Sportsman. South African born, his heart, it seems is overseas.

The Late Alfred Beit, Helpmate of Rhodes in many a mighty enterprise.

"Nor toiling asked more recompense of fame
Than to be coupled with another's name."

One cannot draw the parallel too closely in this connection between the dead Rhodes and the living Smuts. For Rhodes was well served by these Captains of Industry and Smuts has not the best of material to draw on amongst the men who have pushed themselves to the forefront of South African business.

The Stormy Petrels.

Our great mining magnates of the present time are mere birds of passage, here to-day and gone to-morrow. The country which has given them their wealth and circumstance sees exceedingly little of them. Occasionally they visit South Africa perhaps to baulk a much-needed revision of our obsolete mining laws, or to endeavour to coerce the Government into parting with enemy shareholdings. These stormy petrels, whose ultimate aims in life appear to be the purchase of high titles or fame in the world of racing, are not achieving anything for South Africa, and since the big houses have eschewed politics their voices are not even heard in the House of Assembly in defence of an oppressed mining industry. Sir Abe Bailey, with his multitudinous mining and other interests, it is true, sits on the Government benches. But he, too, spends little of his busy time in the land of his birth, wherein he has amassed a magnificent fortune. He is here for the elections and during attendance at a partial session has hardly distinguished himself by "slinging mud" at our Portuguese neighbours without enunciating one single bit of new constructive policy designed to remedy the existing position of the Transvaal in regard to its natural gateway of Lourenco Marques. The truth of it is that the great leaders of the mining industry having well feathered their nests care precious little about South Africa except for what they can get out of it.

Richard Rouillard, a Mauritian settled in Natal, and who has in the past few years initiated and established huge mining and agricultural enterprises. A man of boundless ambition, foresight, and energy, young in years but shrewd in business, who if given a free hand would make South Africa prosper.

The Mines in the Hands of Clerical Nominees.

Administration of the mines is left to a number of nominees, most of whom are glorified clerks shorn of personality or powers of imagination, and possessing a strange faculty for doing the wrong thing at the wrong moment, or else of doing nothing at all.

A Monument of Ingratitude.

The extent to which our millionaires care for South Africa is well evidenced in Johannesburg itself. The Golden City upon which they have fattened, is as a recent American visitor put it, a monument of ingratitude. It is distinguished by its lack of institutions dedicated to the public by the men alive to-day and who have made their millions out of Johannesburg; this town which once was good enough for them to live in.

To-day, the Sachsenwald Forest, Johannesburg's one and only beauty spot owned by a big Corporation, which has fattened on the country is in jeopardy of being destroyed. It is generously offered to the town at a price beyond the capacity of the town's finances. Surely, it should be the proud privilege of those who have made their millions in and out of Johannesburg to present it to the people of the Golden Rand, which has given them their honours and their magnificent purses.

A Millionaire's Epitaph.

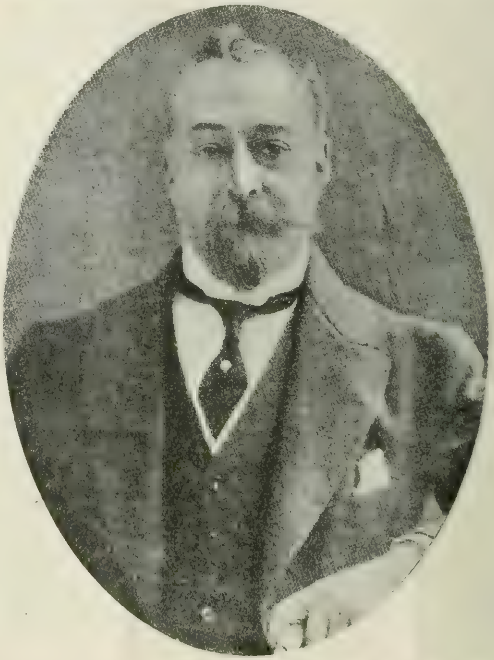
In this respect the moneyed powers behind the throne might, it seems, learn much from a study of the spirit and unassuming charity of the late Alfred Beit. He of all the men who worked with Rhodes and called him master seemed to have acquired in an unobtrusive and non-forceful manner some of the Imperial genius of the Colossus who predeceased him.

> " Nor, toiling, asked more recompense of fame
> Than to be coupled with another's name."

Beit worked hard for South Africa and that great Northern State which took its name from Rhodes, and Beit's thousands have been liberally showered upon the sub-continent. Beit, who

> " Gave by stealth, nor rose a new-made knight,"
> He worked for England to be dubbed 'Herr Beit.' "—

as Edmund Garrett expressed it in the millionaire's epitaph of the " Westminster Gazette."



Mr. S. B. Joel, reputed to be the second wealthiest man in the British Empire. This Journal would like to see Mr. Joel resident in the country which contains so many of his vast interests.

If South Africa, and particularly the Rand, is rich in fortune seekers, who having made their piles become to us foreign adventurers for all we see of or benefit by them, it is singularly poor in big men of large constructive business ideas. We have no Leverhulmes here to give us a financial lead or to build up new enterprises which will take the place of the diminishing mines.

On the contrary, we are given dismal pictures of grass growing in our very streets.

What of the Cabinet.

There are no pushful, far-seeing men at the head of affairs either in the Government or in the Mining Houses of to-day. So far as the direction of our national affairs is concerned, we may hope for much from Sir Thomas Smartt He at least has great honesty of purpose and a virile brain. But there is no one in the Cabinet who has anything which approaches the foresight and forceful personality of Rhodes, neither is there an astute financier. Are there such men to be obtained in the country to-day? I believe there are, but one must go outside the welter of our political mediocrity, and the poor talent of the Mining Houses, to find them.

Richard Rouillard.

There is, for instance, in Natal, which is to-day the only progressive Province of the Union, a man who in the last few years has achieved and has successfully achieved, more pioneering work of far-reaching consequences, and who has cut more new ground than any other inhabitant of the Union. That man is Richard Rouillard, who arrived in the Vryheid district about a dozen years ago, and became interested in certain coal propositions in this area about the time that the railway was being extended to Hlobane. Mr. Rouillard has since played a very leading part in the flotation and successful development of what is known as the Mauritian group of coal mines. The construction of the line to the Hlobane colliery forged a link in the hitherto unbridged distance between the high and settled altitudes of Northern Natal on the one hand and the lower lying country west of the Lebombo. About this time Mr. Rouillard appears to have begun to think in terms of the low veld with its unmeasured and unappreciated possibilities. At any rate he began to acquire farms in this Cinderella of territories and to engage in agricultural operations. These interests subsequently were incorporated in the Candover Estates—a company floated by Mauritian financiers and merchants with a nominal capital of £100,000. Rouillard's enterprises were at first regarded as the escapades of an optimistic lunatic; even to this day some of the good people of Vryheid deplore his pioneering and foresight and shake their heads at his ambitions which in a considerable degree savour in their daring of the once laughed-at projects of Rhodes.

Robert Williams, the Maker of the Modern Congo. A man who has gone ahead of the advance guard of British enterprise in Southern Africa, and whose will and energy would have been well employed in the service of British South Africa.

But Candover to-day amply justifies the dive into the dark which this enterprising Mauritian made a decade ago, and if dreams come true and the great and fertile areas of Natalia incognita become the prosperous farms of scores of returned soldiers and other settlers (and there is no reason why this should not come to pass in the next few years) then indeed South Africa should acknowledge its debt of gratitude to the restless mind and the far-seeing vision which years ago saw the boundless possibilities of the great Mogut and Ubomo Flats.

If a place could be found for a man like Rouillard in the Supreme Council of the Government, this country would go ahead by leaps and bounds. Place Rouillard in command of Mines and Industries and Transport, and instead of the paradox of the richest country on earth being full of unemployment, poor whites, and distress, we should, very soon, have a sub-continent booming with new industries, with mining fields released from the shackle of obsolete mining laws active in every part of the Union, with new railways opening up many thousands of acres of productive soil, with well-made roads feeding the main arteries of the railways, and with at least one new harbour to handle the increased trade of the country.

Rouillard would ride rough shod over old political prejudices and the vested interests, which have baulked the progress of the country for so many years. His perseverence and optimism would dissipate the atmosphere and the puny spirit of "It can't be done because nobody has done it before," which of recent years has laid strangle hold upon the country.

For the Good of the Country.

I was chatting with Rouillard the other day in Vryheid. A big map of South Africa was spread out before us, and he was telling me of some of the projects which he has in his ambitious mind. We were talking of land-locked Rhodesia, surrounded by the dominions of friendly but foreign States. Rouillard, instead of attacking our neighbours in the House of Assembly and the Press, would bind Rhodesia closer to us and draw her trade and traffic downwards to Union ports along a great trunk line which he foresees will extend along the eastern littoral. We marked that strange hiatus in sane railway building, the unbridged miles between Messina and West Nicholson. It is only a matter of 80 easy miles, but because of vested railway interests in semi-desert Bechuanaland the gap must not be bridged, and so communication between the principal centres of the Union and Southern Rhodesia has to be deflected hundreds of miles through barren and unproductive country. I pointed out to Rouillard that such a scheme as he proposed would meet with violent opposition in some quarters. "But it would be for the good of the country!" he exclaimed, "and things that stand in the way of progress must be swept aside." That is the kind of spirit that South Africa needs. We want progress and relief from all the antiquated and obsolete ideas and intrigues which are still kept alive by men in power, who by their greed of old-age are thwarting the bigger projects of the younger men still battling on the rungs of life's ladder.

Schlesinger v. Burton.

Rouillard is still a young man. He is no more than 47, and twelve months of his restless and indomitable spirit in the Union Government would work immense changes in the fortunes of this country. But progressive policy would require courageous and big finance as its coadjutor. If I. W. Schlesinger, Controller of Theatres and Bioscopes, Films, and Life Insurance, Real Estate and Orchards, were given control of the financial policy of the Union, he would find all the money needed for the new enterprises, and would at the same time balance his Exchequer.

Schlesinger, like Rouillard, has risen to power alone and unaided by his own imaginative brain and his shrewd business ability. He is not given to speech-making, nor does he pander to the political pundits. So far, he has not sought public life. He is probably not desirous of purchasing an empty title, and until recently few people believed in him. But the wonderful organisation of his affairs and the many successful enterprises he has built up are proof of the astuteness of his outlook, of his ability to handle big business, and of his financial genius. If our present eloquent Minister of Finance, Mr. Burton, encountered Mr. Schlesinger in the course of a business deal, who would secure the best of the bargain? It is hardly conceivable that Mr. Burton would achieve the victory, and it is more than highly probable that Mr. Schlesinger would win the contest in the first or second round.

There is, too, another forceful personality in the affairs of Southern Africa, Robert Williams, the Britisher who has played such a tremendous part in the development of the Belgian Congo and Northern Rhodesia, the King of the Copper Mines and the Lobito Bay Railway, the key to Central Africa. We, like Rhodes and Williams, must ever look northwards and realise that the Union is an integral part of a great Continent. In the larger African policies and developments of the next few years Robert Williams will be a big factor, and the Union could do with his clear vision and transcontinental ambition.

If men like Rouillard and Schlesinger and Robert Williams were placed in charge of the country's progress and finance, South Africa would soon shake off the creeping paralysis which now besets her and against which there is no man set in authority over us who seems to possess the ability to turn us from the downward paths which we are pursuing.

Government by Oratory.

We, in common with most other countries, are getting tired of Government by oratory. Wise legislative action is being paralysed by the blight of "Furor loquendi." We need men of action and foresight,, and if long-winded and generally unimportant speeches be still necessary for the carrying on of the country's business, well let the Government employ professional and bilingual speakers to enrapture the House of Assembly and the Senate, or to enthral the countryside with their eloquence, in order that the Ministers of Progress may have time to attend to the affairs of the nation.

An Industry Without Brains.

So much for the Government. When we come to our own mining industry of the Rand we are treading on ground nearer home, and it will be policy to leave personalities out of the question. But just as surely as the whole country is in need of a leader—of some man with a little of the divine fire of Rhodes—so is the Rand in need of someone possessed of imagination and energy, who will rekindle the dying embers of industry. And if proof of this were needed, one has only to examine the recent weaknesses and blunders of that Supreme Council which orders the destinies of the gold mines, and is termed the Chamber of Mines. It would be idle to repeat the many accusations of incompetence which this Journal has of late alleged against the local Sanhedrin of the magnates who have left the Rand to its fate because they are too wealthy to live here. But these things are set in print, and much as it may be sought to camouflage the blunderings of the nominees who direct the policy of mining, there is a widespread conviction that the allegations are well founded.

We are all tired of plaintive wails about the plight of the Rand, of the debacle of the diamond mines and the ruination of the collieries. We all eagerly listen for some authoritative voice which will speak hope and progress, and for some mind which will conceive in terms of building up and not of breaking down.

Anno Domini and Unimaginative Clerks.

Many of the present Captains of Industry are too old to have any constructive ideas left. They are suffering from that insidious and inevitable disease which is known as Anno Domini, and they must make way for younger men. And others through long years of desk routine with its stifling influences on initiative are unable to think ahead of next month's big cheque, or have one single conception which dominates the fear of doing something which may jeopardise their privileged positions.

MINES DEPT. EXAMS., 1920—1921.
CERTIFICATES AWARDED INSTITUTE.

SURVEYOR'S CERTIFICATES—March, July and October (Extra) Exams., 1920. 100 per cent., 50 per cent., and 66 per cent. respectively of S.A. total.
MANAGER'S CERTIFICATES.—Two Exams (Sept., 1920, Jan., 1921), 17 out of total 28 in S.A.; 12 Certificates, May, 1921.
OVERSEER'S CERTIFICATES.—Two-thirds of the S.A. total for year 1920. 75 per cent. for January, February, March, 1921.
COAL CERTIFICATES.—Candidates being enrolled.

Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St.

And behind all hangs the pall of the stock market and the money-grabbing considerations of those who pipe the threnody to which we bow our heads in impotent woe, and who will in their own good time tune the lute so that we may dance once more. Would Rhodes have endeavoured to well nigh bankrupt the country for the sake of securing control of a parcel of scrip formerly owned by our late enemies and now vested in the State? No; most emphatically no. And so we wander on through avenues of darkness and uncertainty without policy or outlook. The Government and the industry alike look for some man who, though he may not possess the vision of the greatest of all Englishmen who settled in South Africa and was content to die and be buried in the land of his adoption, will at least possess the ability of a real merchant prince like Leverhulme or one like Strathcona, the builder of modern Canada. There are such men in South Africa to-day. But they are not to be found either in the Councils of the Government or the Head Offices of the Mining Houses. We must go afield to find them.

We want men who if they cannot unlock the barred gate which baulks an influx of settlers will break that gate down. We need men who will amend the mining laws, so that mining is encouraged and not discouraged, and men who will build railways and roads and open up the country. And for this we need men who will provide money in large sums. It does not matter how they find that money; we could easily raise a million a month by means of State-controlled Premium Bonds. More than that, we could, if we had a progressive policy controlled by practical leaders, obtain a hundred millions from overtaxed Europe for the development of this wonderful country. We want a man who will think beyond the Limpopo and who by a wise and liberal offer of partnership will induce Rhodesia with her vast resources but slender population to march hand in hand with the Union to a magnificent and unassailable prosperity.

We must search for leaders outside the mediocrity of our present politics and beyond the portals of the great Corporations which, under wise direction, helped to build the pillars of State, and now through indifference and ineptitude are undermining the whole edifice.

We must look elsewhere for leaders who we may follow, if necessary, through contempt and reproach to an ultimate triumph based upon administrative ability and a courageous imagination without which no nation, however rich it may be in natural resources, can adequately prosper.

OWEN LETCHER.

Zaaiplaats Tin.

Results for the Month of May, 1921.—Mill ran, 4 days; Concentrates won, 13.35 tons; Capital expenditure, nil; Estimated profit for May, 1921, excluding Government taxes and directors' fees, £19 7s. 10d.

Standard Bank of South Africa.

A dividend has been declared by this bank for the three months ended March 31st last of 3s. 6d. per share, as a final dividend for the fifteen months ending on that date, with a bonus for the fifteen months of 3s. 1½d. per share, making, with the interim dividends, a total distribution of 16½ per cent. for the year. A sum of £50,000 has also been set aside to writing down premises, £150,000 to pension fund, and £206,724 is carried forward. The dividend is the same as paid for each of the two previous years. The reason for the declaration of dividends for a period of fifteen months is explained by the fact that the financial year of the bank has been altered. Those interested in this institution will learn with some satisfaction that investments stand in the bank's books at the market value as at March 31st last.

Prolongation of the Gold Mining Industry.

A PLEA FOR OPENING UP NEW MINES AND REMODELLING THE GOLD LAW—THE OUTLYING FIELDS OF THE TRANSVAAL—CONDEMNATION OF THE DOG IN THE MANGER POLICY.

By W. T. Hallimond.

We are happy to publish the following well-reasoned and telling denunciation of the present atmosphere of indifference which is abroad in regard to the outlying auriferous areas of the Transvaal by Mr. W. T. Hallimond, the well-known consulting engineer of this town, who is one of the oldest mine managers of the country and has held high office in the technical administration of the big houses. Mr. Hallimond compliments the "Journal" on its outspoken article of a fortnight ago and agrees with us that the Mining Law is in urgent need of revision and that efforts must be made to open up new mines to take the place of the declining ventures of the Central Rand. Mr. Hallimond has, too, something to say about the dog in the manger policy which hampers development in our outlying areas.

I promised in a letter to you, appearing in your issue of the 4th June, that I would on a future occasion add some evidence of the existence of payable reefs in the shales of the lower Witwatersrand beds, as well as in the outside fields of the Transvaal and Free State.

I am not an expert geologist, although geology has been part of my training, and having over 33 years' experience of the Witwatersrand and other gold fields of South Africa I feel that I am justified in giving my views on the subject. Neither am I going to waste time or space in your "Journal" in the discussion of the identity of certain reefs in the Central, East and West and Far East Rand.

Surface Plant of an "Outside" Gold Mine.

"Too Much Academical Science."

We have too much of the academical and not enough of the practical side of the science thrown at us; although it does make one gasp when one finds a leading geologist—once the Chief of the Government Geological Survey—omitting from his paper on the "Great Witwatersrand Gold Area" such a well-known part of it as the Vaal River gold field. However, this omission was promptly taken up by our old friend, Mr. David Draper at the Institute of Mining and Metallurgy in London, when the paper was discussed, and Dr. Mellor acknowledged the omission.

I mention this by the way, so that prospectors should not be misled by the statements or mis-statements even of the Doctors of the Science. Dr. G. A. F. Molengraaff, as far back as 1904, writes (page 9): "The auriferous conglomerates in these beds are known as the Vaal River gold field. They have not up to the present yielded results entirely satisfactory to the prospectors, but their future does not seem to me altogether unpromising."

What is required in the country is gold reefs of payable values to take the place of the rapidly diminishing mines and of those already worked out on the Central Rand. Leave the professors of geology to settle what geological age the reefs belong to, and let us concentrate on "outside" propositions. About one matter I feel sure everyone interested is agreed; and that is, that the Gold Law must be altered, so that prospectors may be encouraged to go out and prove the gold-bearing areas which we know exist, but which up to the present cannot be tested economically under the present conditions of the Gold Law. These prohibitive conditions have been so much before the public of late that I will not again refer to them.

A Tribute to the "Journal."

Your article on "Wanted: A New Rand" in the issue of the 18th June is one of the greatest interest and value at the present moment, and provided the Government agrees to modify the Gold Law the smaller capitalist will have great opportunities to invest his money, employment will be forthcoming for the unemployed and for phthisical miners on shallow propositions, and gold-mining in the Transvaal and other Provinces will again be in the ascendant.

Let me instance a few of the districts which I have visited during the last ten years.

Eastern Transvaal Gold Fields.

Take Barberton: Those who have stuck to it and worked on proper lines have not done badly. The Sheba has had its troubles, but is again looking up. A few men who put not only the little money they had saved, but also their experience and hard work into a Barberton property have done remarkably well, when the company which owned it previously could not make it pay. There are many good propositions in the Barberton district, developed in some instances and showing very payable values, which would give excellent returns, provided they are worked on a purely economical system.

I could write chapters of the reasons which have been given me, to account for the non-success of Barberton district as a gold field, which are all more amusing than truthful.

Your issue of the 4th inst. gives an account of the opening of a 20-stamp mill driven by water power at Slyhoek (The Slyhoek Mines, Ltd.), where they have been developing for three years. The water race is two miles long and a tunnel 825 feet long is included. Here is a small concern worked on proper lines, and I have very little doubt it will show very good returns on its capital. It is a quartz body interbedded in the horizontal shales of the Pretoria series of the Transvaal system.

Proceeding northwards, we have the Sabie and Pilgrims Rest gold fields. At Sabie small mines worked on the simplest methods have done well for years. Refractory ore in some cases compelled the closing down of one or two mines, but there are several still making good profits, especially where there is no "head office" administration.

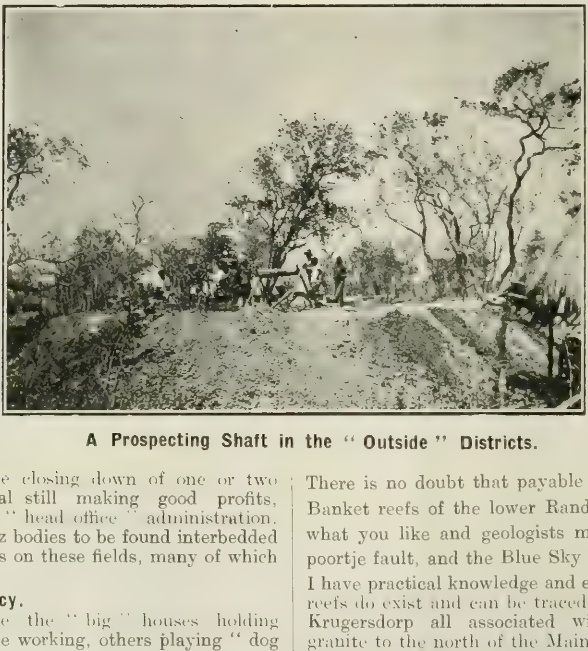
There are numerous quartz bodies to be found interbedded with the shales and quartzites on these fields, many of which are highly payable.

The Dog in the Manger Policy.

Here, however, you have the "big" houses holding square miles of country, some working, others playing "dog in the manger," and so holding up a valuable industry whilst the principals at company meetings in Johannesburg are proclaiming the "fall of the gold mining industry," and fearful lest smaller capitalists should secure even a modicum of the coal areas of the Transvaal, are now devoting their energies towards securing every available coal farm near the existing or proposed lines of railway.

Promise of the Zoutpansberg.

There are other gold mining areas in the low country, such as the Murchison and the Ellerton-Birthday line, all geologically belonging to the Swaziland system (vide Hatch and Corstorphine). In the Murchison Range many mines were worked even prior to the existence of the Selati Railway, and very naturally the working capital was exhausted in the transport of plant and machinery and mining material, whilst others closed down on account of the refractory ores encountered. There are, however, many propositions in this district which could be profitably worked by the small capitalist on the lines already referred to.



A Prospecting Shaft in the "Outside" Districts.

The Pietersburg district is also a field deserving of renewed attention, as the cause of many failures was expensive transport in the pre-railway days.

In the Potchefstroom and Klerksdorp districts we have mines such as the Machave and the Africander, which must not be overlooked. These mines are not standing because of unpayable values, each having its individual cause, which it is not my province here to discuss. My object is to point out where under better conditions of the Gold Law and fair economical management a large field is open for the capitalist. It is madness to say that "because the industry" (gauged by the Central Rand only) "is manifestly past its zenith" that "agriculture is the only hope, etc.," for the country's future.

What is the value of agriculture if you have no markets for it?

Having glanced at the outside gold fields, I would in conclusion again draw public attention to the conglomerates in the lower Witwatersrand beds.

The North Rand.

Your article on "The North Rand" in the issue of the 18th inst., giving the result of an investigation of the "North Rand Gold Mines, Ltd.," Company's property is also interesting at this particular period of the history of the Rand There is no doubt that payable values will be found in the Banket reefs of the lower Rand beds. You may call them what you like and geologists may theorise about the Witpoortje fault, and the Blue Sky fault, till Doomsday. What I have practical knowledge and experience of is, that payable reefs do exist and can be traced from Heidelberg to west of Krugersdorp all associated with the shales overlying the granite to the north of the Main Reef which in many, many instances have given highly payable values.

True, the amount of work done on this line is small, but surely so great a field is not to be condemned on that account. That is probably one of the reasons of its dormant existence all these years. If you find gold in a conglomerate in the shales of the North Rand or lower Rand beds go on with it. If the mines of the Far East Rand or any other gold field stopped because of finding a proportion of low values there would never be any gold mines at all.

My main object in writing the above is to offer what assistance is in my power to those like yourself, who are endeavouring to prevent the "grass growing in the streets of Johannesburg" by a constant and earnest appeal to the Government to improve the conditions of the Gold Law, so that instead of obstacles being set in the way, every assistance and encouragement should be given to those who have spent years of time and their little all of capital in prospecting and exploring the country's mineral resources

Gold Law Reform.

CONSTRUCTIVE CRITICISM —HOW TO REVIVE MINING.

By C. Howard.

Mr. Howard, the author of this thoughtful article, has for many years made a study of the Gold Law, particularly in its reference to the outlying districts, and in this article he shows how the burden of it has crushed the efforts of the small worker and how the law may be amended so that gold mining, instead of being a waning industry in this country, may again become progressive, attractive and prosperous.

It was lately asked in this paper why there is no progress in Transvaal gold mining outside the Rand area, in spite of the high premium on gold in relation to sterling and the progressive increase in the buying power of the sovereign. The reason lies solely in the repressive nature of the Gold Law, which has the effect of stripping the State of its rights to precious metals and conferring them on the landowners. A summary of the law proves the statement, without need of illustration or argument.

The gold-bearing area comprises Crown lands and private grounds, the latter being the larger and more important.

Private Ground.

In the case of privately owned ground the intending prospector has first to arrange with the owners, whose terms are varied and discouraging. The farmer used to ask alternatively for monthly option money and a large sum for the mining rights, a heavy tribute, half the ground selected by the prospector, or sometimes the prospector's only reward was to be half the price over, say £3 per morgen, realised by the sale of the farm in consequence of discoveries, and if terms could be arranged, then the signatures of a number of joint owners of mineral rights had to be obtained. The farmer is best left alone. The land companies, who own something like a fifth of the Transvaal, are not quite so difficult. They will frequently grant an individual tributing rights at 5 or 10 per cent., retaining the right to buy him out at a fixed sum plus value of development if he opens up a good mine. This means that the company gets its ground prospected without risk or expense and is paid the tribute for granting the permission. When the mine is proved to be worth more than the fixed sum plus development, the company can exercise its option.

If the owner, whether individual or corporate, ascertains that the farm carries good gold and decides to have it proclaimed, he first beacons off two mynpachten, each 10 per cent. of the area to be proclaimed, in long rectangles. Since the accessible reef exposures exist only in the sides of the water-sculptured valleys, the owner retains most of the valuable ground and water. The licence money on the ground outside the mynpachten is twice that on Crown land, and such ground is usually not worth attention if the mynpachts have been judiciously selected.

With some insignificant exceptions, ground other than Crown lands is thus closed to digging except by the owner, and he can seldom exploit it because the great gold-bearing formations of the country outside the Rand, viz., the Swaziland formation, the Black Reef Dolomite and Pretoria beds, carry possibilities of a number of small and medium sized propositions which are not suited to be the bases of large financial units. The farmer cannot work his mynpachts and the companies will not buy them.

Crown Lands.

In working the relatively unimportant proclaimed Crown lands the digger is handicapped by claim, digger's and stand licences and profit tax, which is increased by not allowing his own labour to be counted as part of the cost. The liberty to hold as many claims as he can pay for induces him to hold more ground than he can work, to his own impoverishment and the exclusion of other diggers. Anyone conversant with the outside fields can cite numerous instances of this.

It would be tedious to enumerate and describe the auriferous sections thus closed against individuals or small syndicates. A study of a geological map of the Eastern Transvaal south of the D.B. line and east of the coal measures shows a large area of dolomites and Lydenburg beds known to be valuable, and the same is true of the long strip of country west of the E. escarpment from Elandshoek Station to Mariepskop.

It is certain that the removal of the disabilities described would attract enterprise to these and other areas. They have great attractions to the gold miner. Climate, water power, timber, railways, and fertile soil, make his work easy and cheapen his operations. People are alive to the growing value of gold, and if these areas were open on

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fair terms, men and money would come in. An instance of the effect of a good gold law can be seen in Rhodesia. Under the original terms of the Chartered Company the company held a 30 per cent. interest with the claim-holders. This was so deterrent (although a trifle compared with our regulations) that in spite of liberal and reckless support, the output a few years after the Boer War was only 600,000 a year. The company rescinded the 30 per cent. clause and substituted a 2½ per cent. royalty. In a short time the output rose to 4,000,000, the whole energies and capital of the small population being attracted to the industry by the new terms.

Suggested Reforms.

A similar result would follow here if we adopted the essentials of the Rhodesian law, modifying it to suit our different conditions on the following lines:—

1. The new law to apply to all ground not held under mining title.
2. Owners' mining rights to be commuted for a tribute of 2½ per cent.
3. All grounds to be thrown open to prospecting and mining, due protection being afforded to existing rights and industries.
4. No one to peg more than the claim, which will equal in area 20 claims of the present size, and to be pegged so that the length shall equal twice the breadth.
5. Licences and profit tax to be abolished.
6. Work to be the condition of tenure, the failure to perform work rendering digger liable to a small fine. This condition to cease when a certain total of work has been done.
7. Royalty on both private and Government ground to be 2½ per cent. Thus on private land the payment will be 2½ to owner tribute, 2½ to Government royalty.
8. Full details of output to be published monthly.

In reference to possible damage to farming and other vested interests, it is to be noted that most of the gold-bearing ground is in mountainous and rugged parts, where there is no population or cultivation. The fear of damage to farmers is chimerical. On the other hand, the creation of new markets in their neighbourhood, with demand for transport and opportunities of employment, would benefit them enormously. In addition, the 2½ per cent. tribute would be a tangible benefit, and more useful than dreams of selling the farm for £30,000, a favourite figure in the imagination of the backvelder. The problems of non-employment and poor whites would be partly solved by fresh and vigorous exploitation of our potential fields, which would follow automatically on the removal of restrictions, and revenue would be directly and indirectly benefited.

The scheme has been before the Department of Mines since 1908 and has recently been advocated by Mr. Tudor Trevor. It would receive the support of all sections of the population, and especially of the farmer, who knows that a 5-stamp mill in his vicinity gives him a better market than 5,000 stamps 200 miles away. It may be pointed out in conclusion that work on the outcrop propositions of the outlying areas would be particularly congenial to sufferers from phthisis.

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The Puzzle of the Pebbles

A FEW NOTES ON SOME OF THE GEOLOGISTS OF RAND GEOLOGY.

By Obtuse Student.

The following article has been forwarded to us by one who signs himself "An Obtuse Student," and whilst we do not necessarily endorse his various criticisms we consider that it is a very fair view of the perplexities of our stratigraphical problems, and we publish it accordingly.

To the student, the various schools of Rand Geology are somewhat confusing, and this is how in my ignorance I size it up.

Firstly, there is the orthodox school of Dr. Mellor, who, I believe, says:—That the Main Reef series, on the Far East Rand, is represented chiefly by the Main Reef Leader. There has been, so they say, a thinning out to a delta of the larger body, as known in the Central Rand area. Instead of a quartzite footwall it has a shale one, i.e., that a sandy bottom to this pebble bed was replaced by a muddy one in the Far East section. A parallel, on a smaller scale, can be seen in most of our rivers. Evidences of this gradual change from quartzite to shale footwall, I believe Dr. Mellor maintains, are more and more apparent as one goes eastward. Dr. Mellor also holds, so I understand, that the Main Reef Leader is the Van Ryn Reef and the Nigel, under different names, but it remains the gold carrier, however named. The data from boreholes, shafts and underground workings from west to east have been painstakingly gone into and scientifically correlated, and his deductions therefore are roughly as above stated.

Then we come to the heterodox school, headed by Mr. Bleloch, who, I believe, states:—That the Van Ryn Reef is not the Main Reef Leader, nor the Nigel, but a reef older and underlying the Main Reef series and that the Nigel is a distinct reef underlying the Van Ryn again. Of course, these are not the only reefs in these series. I am only writing of the better known ones. Mr. Bleloch builds up his geology not only from surface and underground observations, but also from minute examination of the different pebbles, etc., of the various reefs and from this he argues that each and every reef has its individual characteristics which distinguish it from its overlying or underlying fellows.

Lastly, we read the letters of that doyen of the geologsts, Mr. Scott Alexander, or as he prefers to call himself, "Stratigraphist." Mr. Alexander writes—and here he and Mr. Bleloch are in accord—that the Van Ryn Reef series underlies the Main Reef series, but here they diverge. Mr. Alexander says the Van Ryn Reef and the Nigel are identical reefs. Further, he says the Van Ryn Reef and Main Reef Leader are in about the same relationship to each other as a grandfather to his grandson. The one was a man before the other was born. Again where you have the dolomites of the Black Reef age, Mr. Alexander lays it down as an axiom that the Black Reef series underlies it to a vertical depth of some 3,000 feet, and therefore some of the Far East Rand mines are working on that Reef and not on Van Ryn. Take, for example, Government Areas. The distribution of the gold in lenticles which has led to modern selective mining, he argues, also points to it being Black Reef. If Mr. Alexander is right, Government Areas would have to sink much deeper to find the Van Ryn Reef.

Mr. Bleloch again holds that State Mines are exploiting the Van Ryn Reef and that the Nigel below that has not been touched. Now to have a look at one of Mr. Bleloch's properties. I hope he will not take amiss what I say about his geology, because if it were as charming, to the general, as his personality, he would be like Lady Tarpeia and have the real gold ornaments showered on him and not the attentions he hasn't asked for. I do not wish to infer that he betrayed the capital; rather the reverse, that the Capitol betrayed him.

The Southern Van Ryn, according to the orthodox school, is a deep level proposition of the Van Ryn or Nigel Reef, but it has near the surface the reefs belonging to what represents the Kimberley series on Far East Rand.

According to Mr. Scott Alexander, if I read him aright, this property has the Black Reef series on top, then the Main Reef series, and at a still greater depth the Van Ryn series.

Mr. Bleloch again contends that he has the true Van Ryn Reef, almost at surface. I fancy he rather ignores the data of the boreholes to the east of his property. If the late Dr. Carrick was right about the Blesbok Spruit being one huge dyke, then it is quite possible that Van Ryn Reef can be found on both eastern and western sides of the spruit at no great depth. On the whole, it seems to me as if the critics of Mr. Bleloch's geology in regard to this property make it more valuable than he himself does (in spite of his claims that it is an outcrop proposition).

Again, take the old Marie-vale mine—Nigel Reef according to early works on the subject. Nigel, according to Mr. Bleloch. Molyneux alias "Blue Sky," according to Mr. Alexander, which he states is the self-same reef as opened on the New Florida.

Dr. Mellor's opinion of the reef at this place (Marie Vale) I am not sure of, except that he pointed out in some of the earlier shallow shafts or trenches that it had a dwyka hanging wall, but he may have been referring to the alleged position of Mr. Bleloch's famous Tatham Reef. Mr. Scott Alexander says the Van Ryn or Nigel Reef series has a coarse white grits quartzite as its hanging wall, a shale footwall and a thin layer of talc on the lower contact between the Reef and its shale footwall.

On Mr. Stayt's portion of Holgaatfontein, a short walk from Marie-Vale eastwards, these white grits are well developed and that is where, according to the worthy stratigraphist the Van Ryn Reef is to be found. Mr. Alexander argues that nature does not alter the order of her beddings and that they and their coloration persist.

The Buffelsdoorn, he says, is Main Reef (I did not see the South Reef there, it may need a borehole to find it), and if you go north of that point you will find Van Ryn. Certainly there is a large body of coarse white grits to the north-east of the old Buffelsdoorn mine, apparently similar to those on Holgaatfontein. These two points are some 150 miles apart.

So that his contention of like coloration of like age should be considered. He says further, given a knowledge of the characteristic colour of the quartzites of each series they can easily be identified anywhere, and assigned to their proper horizons. Of course, it does not follow that the reefs of a series maintain the same stoping width or same gold contents throughout, but at least you know where you are.

The geology of the Far West is also very interesting and one might picture a vast syncline there, to account for the puzzling things our geologists tell us about it. Even here, close at hand, we poor students are confronted by other problems, viz., Colorado formations and oyster shells.

In conclusion, I would advise other students to give some consideration to Mr. Alexander's contention re distinctive coloration of the outcropping quartzites of the different ages; Mr. Bleloch's contention that the Van Ryn is not the Nigel; and Dr. Mellor's contention that our auriferous formations are not bound by the laws of the Medes and Persians. There is, however, one golden rule to follow: Never take our geologists too seriously.

B. E.

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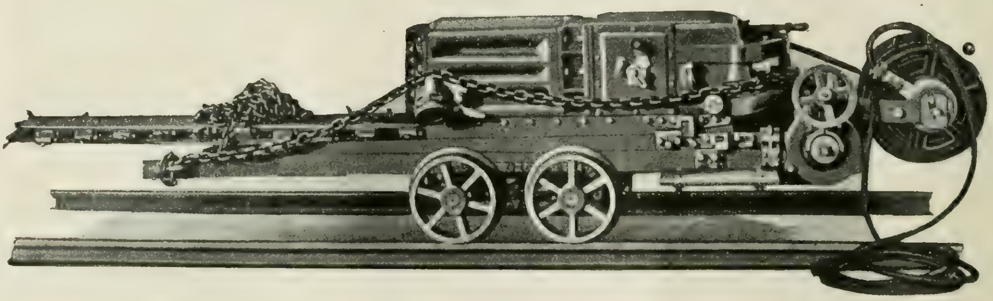

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ETC., ETC., ETC.

Points from the Coal Commission's Report.—II.

The relative position of the South African bunker and the export trade, including coal shipped by sea to Union ports, is reflected in the following figures:—

TRANSVAAL THROUGH DELAGOA BAY.

	Bunker.	Export, Overseas.	Export, Coast-wise to Union Ports.	Total.
1910	120,306	34,990	—	155,296
1911	91,517	22,150	—	113,667
1912	147,947	215,323	—	363,270
1913	232,289	436,960	—	669,249
1914	217,566	361,853		579,419
1915	134,265	324,731	--	458,996
1916	345,912	392,446	—	738,358
1917	444,131	414,387	13,243	861,761
1918	278,995	488,151	—	767,146
1919	241,709	540,586	6,804	789,099
1920	379,707	742,793	—	1,122,500

NATAL THROUGH DURBAN.

	Bunker.	Export, Overseas.	Export, Coast-wise to Union Ports.	Total.
1910	1,395,649	57,046	305,099	1,757,794
1911	1,426,319	84,116	298,562	1,808,997
1912	1,209,606	174,087	451,604	1,835,297
1913	1,196,460	355,901	334,209	1,886,570
1914	1,173,853	207,033	213,710	1,594,596
1915	930,687	219,788	211,495	1,361,970
1916	1,519,182	165,167	24,056	1,708,405
1917	1,381,437	132,668	41,456	1,555,561
1918	675,160	664,997	283	1,340,440
1919	882,892	493,408	5,892	1,382,192
1920	1,121,718	652,000	1,194	1,774,912

Bunker coal is also shipped at Cape Town, drawn both from Natal and the Transvaal. In 1920 it amounted to 403,486 tons of 2,000 lbs.

Evidence has been led before the Commission to show that the insufficiency of railway facilities was an important contributory cause of the slow growth of the South African coal industry. Owing to the release of shipping by the Shipping Controller in the early part of 1920, and owing to the world-wide shortage of coal partly due to labour troubles in Great Britain and to the set-back to coal output in European countries arising out of the Great War—South Africa, in common with other coal-producing countries, suddenly experienced exceptionally heavy demands. It was no uncommon event between May and November, 1920, for ships to be waiting at Durban for upwards of 150,000 tons, and at Delagoa Bay for a not much smaller tonnage. The Railway Administration was quite unprepared to meet the sudden abnormal demand, and the collieries admit that they too were taken unawares. It is true that within the last ten years there have been periods when there was an insufficient margin between the railway facilities available and the immediate requirements of the collieries, and out of these occasions has arisen the general impression that railway facilities as a whole have been inadequate. The Commission has it in evidence, however, that so far as general traffic, other than coal, conveyed over the whole of the Union railways is concerned, there has been an increase from 4,750,000 tons in 1911, to 6,800,000 tons in 1920, while during the same period the increase in Natal was 1,800,000 to 3,500,000 tons, indicating that the railway facilities have been considerably increased. These figures indicate a growth in general traffic throughout the Union of 43 per cent., and in Natal of 94 per cent. The collieries, perhaps not unnaturally, claim that they have not benefited from this improvement in railway facilities to the same extent as other industries, the increase in the total coal output of all Provinces from 1911 to 1920 having been 51 per cent., while the Natal output increased by only 24 per cent., viz.:—

	Tons of 2,000 lb.* 1911.	1920.	Increase. Per cent.
Total output of all Provinces	7,594,944	11,473,452	51
Total output for Natal	2,679,551	3,321,594	24

On the other hand, the Railway Administration can point to more than one occasion in 1918 when upwards of 55,000 tons of coal was on hand at Durban, and to other

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* Supplied by Statistical Department, S.A.R.

On the Vryheid Coal Fields.

occasions, before the war, when it was no uncommon event for 20,000 to 30,000 tons to be available and no ships to take it away, which go to show that the demand for shipment coal is intermittent.

The quality of the coal required for export and bunker purposes must naturally be the best that the country can produce, for it is only the best that can compete against British and other coals. For example, it is for this reason that in the Transvaal only the better class coal in the Witbank area has been able to establish itself. In Natal, the higher grade coal is not confined to a restricted area, and nearly all of the collieries produce coal of a grade acceptable for shipment.

In addition to the shipment trade, the collieries, of course, supply all the industrial and domestic coal needs of South Africa, including the large demands of the South African Railways and Harbours. The South African Railways and Harbours is a large consumer of coal in the Union, ranking with the gold mining industry and the shipment trade as the three largest customers in the trade.

The total output of 1920 was divided amongst the various classes of consumers as follows:—

	Tons of 2,000 lbs.	%
Shipment	3,182,400	28.4
Railways	2,641,061	23.6
Gold Mines	2,006,588	17.8
Victoria Falls Power Co.	1,229,526	11.0
Other Consumers	2,151,329	19.2
	11,210,904	100.0

For the purpose of this report, it is unnecessary to enter into any elaborate explanation of the composition and qualities of the various coals found in South Africa, but some information on the subject is necessary to elucidate the discussion of the points which will arise. In determining the value of coal, the most important factor is its calorific or heat value. This is usually expressed by giving the number of pounds of water the coal is theoretically capable of converting into steam at the boiling point of water. For example, a calorific value of 10 means that one pound of the coal in question will theoretically convert 10 lbs. of water into steam. A coal with a calorific value of 14 is, therefore, weight for weight, worth 40 per cent. more than a coal with a calorific value of 10, if the qualities of the two coals are equal in every other respect.

Other considerations are, however, also important. For steaming purposes, the coal must be able to burn fairly rapidly in the furnaces of the boilers. Anthracite, which is frequently of high calorific value and is found in large quantities in Natal and Zululand, is unsuitable for this purpose, and is, therefore, only mined on a limited scale for special purposes. Further, the coal ash must not clinker and must be easily removable from the fire-bars. It must contain as little unburnt coal as possible, for any such unburnt coal represents a direct loss of the fuel paid for.

The coal itself must also be of suitable size with a minimum admixture of fines or dust, because fine coal clogs the fires, and partly also escapes unburnt if the draught up the smoke-stack is considerable, or unless special furnaces are used. For shipment purposes, fine coal is particularly objectionable, because its presence in any large quantity increases the danger of spontaneous combustion in any coal that is liable thereto.

The better classes of Natal coal, at present supplied to shipping, have a calorific value of about 14.0, and Witbank district coal supplied by the Transvaal Coal Owners' Association for shipment at Delagoa Bay is guaranteed to have a value of not less than 12.5, and actually averages about 12.9. Typical analyses of these coals are as follows:—

	Fixed Carbon.	Volatile Matter.	Ash.	Sulphur.	Moisture.
Natal Coal	66.9	22.4	9.4	1.1	1.2
Witbank District Coal	59.67	24.55	13.47	1.23	1.08

Both these classes of coal yield an ash which is practically free from objectionable clinker, and they burn freely with ordinary draught. Both Natal and the Transvaal have coals inferior to these, and some of the coal mined and sold in the latter Province ranges as low as 9.0 in evaporative value, with ash as high as 25 per cent., or even higher, showing that even so low-grade coal as this is useful, and can, under favourable conditions, such as low cost of mining and nearness to the customer, compete with the higher grades. At Vereeniging the Victoria Falls Power Company has a power station which uses about 400,000 tons of coal per annum from the adjacent Cornelia Colliery in the Orange Free State, of an evaporative value of about 10.7. For the maintenance and expansion of the export and bunker trade only the best South African coals should be utilised, and its quality must be maintained at a uniformly high grade, if the business is not to fall into the hands of competitors.

The outlook for an expansion of the South African export trade (except in the immediate future) is on the whole good. At the moment (April, 1921) there is a set-back, due to the world depression in business, which is enabling foreign coal to take advantage of the superabundance of shipping and consequent low freight from British and American ports,

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and to compete successfully with South African coal in southern ports; but the resumption of normal conditions will undoubtedly give renewed opportunity to South African collieries to expand their market. The cost of production elsewhere, owing to high wages, must for some time remain high compared to the cost of mining coal in South Africa, and must go a long way to counterbalance the advantages of short distance to the sea and the cheap freight in ships which have a return cargo to look forward to. The trade at the East African ports and at Aden and Colombo should, therefore, almost be in the hands of the South African collieries, and a share of the trade at Singapore and other Eastern ports and South America may also reasonably be expected to fall to them. It is obvious, however, that the high prices charged for South African coal at the ports in recent times, under exceptional conditions, cannot be maintained. Competition must inevitably bring about a lower level, and a certain amount of trade has no doubt already been lost by keeping the railway rates and prices high too long.

It is desirable, however, to consider what prospects there are of developing what may be termed South Africa's natural oversea markets. During 1920, of the 1,394,793 tons shipped as export coal from Durban and Delagoa Bay, over 300,000 tons were consigned to markets in which, under normal conditions, South African coal could not reasonably be expected to compete, viz.: Denmark, Sweden, France, Belgium, Spain, Algiers, Gibraltar, Greece, Italy and New Zealand. The bulk of the export coal was destined for ports on the East and West Coast of Africa, in the Indian Ocean, and in South America, which may reasonably be termed South Africa's principal and natural markets.

For the purposes of comparison, the tonnage shipped to these various zones in 1920 is given below, together with the estimated coal requirements of the countries mentioned, compiled from the latest available statistics published by the British Government:—

Country	Shipped from South Africa during 1920. Tons of 2,000 lbs.	Estimated coal requirements based on the latest available information as to pre-war (viz. 1913) coal imports: Tons of 2,000 lbs.
Egypt, Sudan, French Somaliland	456,000	1,828,000
Aden, Ceylon, Bombay, Straits Settlements	202,500	2,055,000
East African Ports, including Madagascar, Mauritius and Reunion	167,500	86,000
West African Ports	25,000	173,000
South America	199,000	6,223,000
	1,050,000	10,365,000

It will be seen that the countries which South Africa might deem to be its markets require something in the neighbourhood of 10,500,000 tons of coal per annum, towards which South Africa contributed 1,050,000 tons in 1920. It is not unreasonable also to anticipate that the development which is taking place both on the East and West Coasts of Africa will also result in their coal imports being increased, unless these countries discover coal of their own. The point naturally arises as to the prospects of the South African collieries obtaining a larger share of the coal business of the countries mentioned.

The Commission gathers that comparatively little expenditure and work are involved in increasing the capacity of the line to Delagoa Bay, and that as a matter of fact the present capacity of the line has not usually been fully taxed. So far as Natal is concerned, the Commission understands that good progress is being made with doubling and regrading the main line. From the Railway point of view it would seem that the Administration is now in a position to handle a larger export tonnage, which will gradually still further increase as time goes on, provided there is a reasonably quick release of trucks at the ports.

The development of the markets referred to is, therefore, one largely for commercial enterprise. It appears to the Commission, however, that that enterprise is handicapped:

Firstly: by competition with coals from elsewhere, which is either cheaper or of better quality.

Secondly: by the want of combination amongst colliery owners, resulting in each operating in various ways to the detriment of the industry as a whole

Thirdly: by the railway facilities being sufficient to carry only a certain quantity of coal;

Fourthly: by the difficulty of securing regular shipping freight at a reasonable price.

The quantity of South African coal available for shipment purposes, of the high grade which that trade demands, is not unlimited, and indeed appears to form only a small proportion of the total resources of the Union. Mr. W. Wybergh, who is at present preparing for the Government a Report on the coal resources of the Union, gave evidence to the effect that only 6 per cent. of the coal in the Witbank area, or about 392,000,000 tons, was of the grade now deemed necessary for shipment purposes. Of this tonnage, moreover, about 35 per cent. is lost in pillars and discarded fine coal, etc. In Natal also, which has not yet been investigated by Mr. Wybergh, it is well-known that the areas of high-grade coal are strictly limited, much of the coal having been denuded and washed away, or become anthracitic by the action of igneous sheets. The conservation of high-grade South African coal, and the alternative utilisation of lower grade coal is a question that will demand serious consideration at an early date. This Commission has, however, not investigated this aspect of the coal question to any extent, as it does not fall within its Terms of Reference. Probably the information at present available is inadequate to allow of any definite proposals being put forward for the better conservation of our coal resources.

Mr. Walter McDermott on Labour Questions.

Speaking in London at the annual meeting of the "C.M.S.," the chairman, Mr. Walter McDermott, naturally had something to say on labour questions. The British coal strike was at the moment looking very black indeed, and the news from this side was none too reassuring. Mr. McDermott addressed his remarks to the British labour leaders and to the white miner in South Africa. The following passage was addressed to the latter, and appears to be that which Mr. Munnik accused us of withholding. As it only arrived by the last mail we could not possibly have quoted it in our last issue. Mr. Munnik's reference to ourselves is, therefore, unusually inept—even for that gentleman. What Mr. McDermott said was: "There are some signs (including an increased efficiency and some active hostility to certain 'reds') that white labour is recognising the narrow margin on which they have been presuming, under their leaders; but if this recognition does not bear more actual good fruit, it is considered by the mining groups that a closing down of the mines would be the lesser of two evils, and, I may add, your directors have instructed their representatives that, if such choice of action comes up for consideration, they have full authority to vote for stoppage in preference to submission to the continued exactions of a small body of labour leaders, who are guilty of constant breaches of agreements they enter into. Of course, we hope that no such necessity will arise, and all possible will be done to avoid it, but there are times when plain speaking is particularly desirable for all who are interested in the industries of the Empire." This is wholesome plain speaking of the sort that can only do good at this juncture, and instead of ignoring it, as Mr. Munnik suggests, we gladly give it prominence.

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The Cape Explosives Issue.

HISTORY OF THE PLANT AND ASSETS—HUGE EXPLOSIVES AND FERTILISER FACTORIES.

Details are now available of the Cape Explosives Works, Ltd., issue of £1,000,000 seven and one-half per cent. debentures at 95. The whole issue was underwritten by the Central Mining and Investment Corporation. In a statement prepared by the directors and submitted to the Central Mining people, the following interesting history of the industry is given:—

"This Company carries on business at Somerset West, Cape Province, Union of South Africa, as a manufacturer of commercial explosives, artificial fertilisers, sheep and cattle dips, and other insecticides and allied chemical products. It owns upwards of 5,000 acres of freehold land in the Stellenbosch Division, on about 2,000 of which is erected one of the largest private explosive factories in the world. The factory was started by the late Cecil J. Rhodes in 1899, in order to secure to the South African mining industry a supply of cheap explosives, and so put an end to the very high prices which were at that time being charged by the Dynamite Trust, which had secured a monopoly of manufacture from the then Transvaal Government. Owing to the outbreak of the Boer War the completion of the factory was delayed, but for the past eighteen years the Company has supplied more than half the total quantity of commercial explosives used in the gold and diamond mines in the Union of South Africa, and has, in addition, exported large quantities of explosives to Australia and Rhodesia. The Company has recently completed a thoroughly up-to-date plant for the manufacture of detonators, which is capable of supplying the whole requirements of the South African mining industry. The great bulk of the Company's expolsives and detonators are sold to its customers in Africa and Australia on co-operative contracts, at cost plus a fixed charge on the capital employed. These contracts secure to the Company a steady return on its investment notwithstanding fluctuations in the cost of raw materials and wages. The contracts have a number of years still to run, and it is probable that they will be renewed on substantially the same terms. The Company's other products are sold on ordinary commercial lines, but the Company's policy has been, and will continue to be, to supply the country's requirements at the lowest prices compatible with a reasonable return on its investment. The new artificial fertiliser works, which are on the point of completion, will be not only by far the largest in South Africa, but will rival in size the most important fertiliser plants in Europe and America. In addition to superphospate of various grades, special compound manures to suit the different crops and varying soils of the country will be manufactured on a large scale. The plant, if worked to full capacity, will at once be capable of an output of 70,000 tons per annum of fertilisers of all grades, and can, by a comparatively small additional expenditure, attain an output of 100,000 tons per annum. The "Capex" brand of the Cape Explosives Works, Limited, is well known throughout South Africa as a guarantee of quality and efficiency. The sales of "Capex" Sulphur Lime solution as a sheep dip and fruit spray during the last financial year exceeded 300,000 gallons, while "Capex" Arsenate of Lead and "Capex" Sulphur for vines are the cheapest and best products of their kind on the South African market. "Capex" Cattle Dip, which has only recently been put upon the market, is rapidly becoming popular, and the sales are expanding satisfactorily"

New Patents.

567. John Joseph Atmore, Alberton, Transvaal.—An improved torch for lighting fuses for blasting and the like.

568. James Harrison, P.O. Box 668, Johannesburg.—Means for clamping hose pipes and the like.

570. Ernest Fraser Jones, Oceans Buildings, Simmonds Street, Johannesburg Improvements in rotating devices for percussive rock drills.

577. John Pollocke Lindsay, P.O. Box 3146, Johannesburg.—Improvements in the method of obtaining gas from coal and in apparatus therefore.

585. (1), Alfred Edward Bulstrode, 5, Harts Buildings, Market Street, Johannesburg; (2) Fredrick James Fruin, 29, Grosvenor Buildings, Loveday Street, Johannesburg.—Self-treating power for machinery.

589. Ingo Emmanuel Kohlmeyer, c/o P.O. Box 3146, Johannesburg. Improvements in or relating to electrical storage batteries or accumulators.

590. George Handley Silkstone, c/o P.O. Box 3146, Johannesburg. Improvements in means for closing holes in pipes, plates and the like, or for making pipe connections.

591. (1) Shelford Francis Sopwith, (2) Matthew John Foggo, Cannock Chase Colliery Co., Ltd., Chasetown, near Walsall, England.—Improvements relating to pit props.

592. Thomas Henry Bradbury, c/o Edgar Allen & Co., 5, New Club Buildings, Johannesburg. Improvements in stop valves.

593. David Stanley Penprase, 41a, York Street, Krugersdorp. Rock drill fitter.

594. John Peter Shaw, P.O. Goedgevanden, via Klerksdorp.—New and improved system of carrying out topographical, rural, engineering, mining, aerial and other survey with apparatus for use in connection therewith.

595. Marie Olive Cranston, Industrial Sites 2 & 4, P.O. Box 192, Benoni. Improved reinforced concrete for the manufacture of cubicle kafir beds.

603. John Penhale, P.O. Box 668, Johannesburg.—Improvements in alcohol fuel.

605. John Richard Williams and Walter Mears, both of Cala, C.P. Improvements in recovering platinum and allied noble metals.

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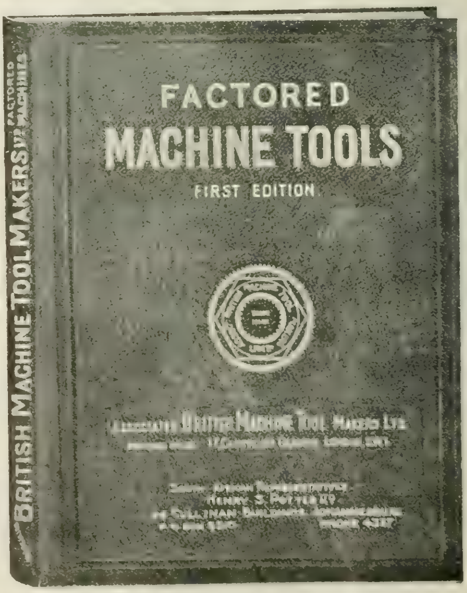

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EDITORIAL.

THE WEEK'S SPEECHES.

The present position of the Rand mining industry has had further attention directed to it during the past week by the speeches made in the House of Assembly on the Mines and Industries vote of a third of a million. Subjects of predominant importance which recently have been dealt with in the columns of this paper were debated in a lively manner.

We notice, for instance, that Mr. Sampson urged that the House " should know the truth of the controversies that were going on " and " should find out the full extent of the reefs and their value." We are glad to note that the Labour member for Jeppe has directed the attention of Parliament to the necessity that exists for making a thorough investigation of the economic extent of auriferous areas of the Southern Transvaal, and we trust that as a result of the interest that at last is being focussed on this matter that the Government will see its way to help mining and particularly the prospector, the small man proposition, and the legitimate syndicate or under-capitalised company by amending the mining laws on the lines of the Rhodesian code which encourage preliminary exploitation of the country's mineral wealth, instead of discouraging enterprise as the South African laws do.

Mr. Munnik followed with a somewhat cryptic reference to *The South African Mining Journal*, which he said had excised from the address of Mr. McDermott at the Consolidated Mines Selection meeting certain " obnoxious clauses."

Lest Mr. Munnik has any doubts on the matter, we may as well assure him right here and now, and with all the emphasis in our power, that the *Mining Journal* holds no brief for the C.M.S. or any other big Rand mining house, and if Mr. Munnik will take the trouble to read this and other recent issues of the paper he will, we think, be bound to admit that whatever the paper's faults may have been in the past, it cannot be alleged to-day that the journal is dominated or inspired by any of the controlling interests which effectually stifle criticism in some of the organs of the Press. But whilst we do not bow the knee to the great gods of Mammon we cannot agree with Mr. Munnik's contention that the mines are not contributing sufficient to the revenue of the country.

One of the troubles of the industry is that mines have contributed too much to the coffers of a Government which, in its short-sightedness, has thought that the Rand industry would continue for ever, and which has for years consistently bled the gold mines until the Rand, and, therefore, the whole country, which rides upon the Rand's back, is suffering from a wasting and economic anaemia. Rather do we thoroughly endorse the telling speech made by Mr. McAlister, the member for Germiston, who harangued the Government for not realising that the goose which has laid golden eggs to the value of over £600,000,000, is dying, and for taking no steps to prolong the life of the industry or to frame a constructive policy which will make provision for the economic salvation of 300,000 whites dependent on the Reef for a livelihood, and of whom a large number are within measurable distance of nothing less than starvation.

We ourselves have said these things so many times that we do not propose to say them again. We can only hope that Mr. McAlister's attack on the Government will stir our somnolent rulers out of their slumbers. But we are afraid that one can hope for very little from the mediocre bureaucracy which shapes our destinies. As we say in a lengthy article which appears in the forefront of this issue, the Government is without a Leader.

Observe, for instance, the fine statesmanship of our Minister of Finance, Mr. Burton, during the debate on the Land Bank Bill also during the week. " I don't know what to do " is one of the masterly remarks made by Mr. Burton during the debate. This expression admirably seems to us to sum up the uselessness of the Government of the Union of South Africa at the present time. " They don't know what to do," and there is not a single man big enough, or with sufficient constructive ability in the House to take these little children by the hand and lead them on to prosperity in the richest country in the world. Neither is there a leader amongst the mining houses. The speech of the President at the quarterly meeting of the Transvaal Chamber of Mines has also a strong undercurrent of " I don't know what to do " running through it. Mr. Buckle spoke at length on the subject of tropical labour, but his reference to the burning question of the day, the reduction of wages, was of the scantiest nature, and in its lack of forcefulness was reminiscent of the weakness and vacillation of other speeches which in recent years have characterised the proceedings of the Chamber.

Perhaps Mr. Buckle realised that he said too much—far too much—about the declining gold premium four weeks ago. We must, at any rate, congratulate him on his tact in now avoiding the difficulties of a subject which are apparently too abstruse for the nominees of those who control more than half the output of the world's gold.

THE SETTLEMENT OF THE COAL STRIKE.

The Coal Strike in Great Britain was settled this week, and the news was received with real relief throughout business centres in this country. It is true that the first effects of the strike in the British coal trade were beneficial to the coal industry of the Union. A new interest was manifested in our coal resources, and colliery directors and our railway and harbour controllers were quickened into unwonted activity to meet the anticipated improvement in the South African coal trade. The coal crisis had also, of course, the effect of increasing the premium on gold, which directly benefited the industry of the Rand. Against that temporary fillip to the gold and coal industries of this country must be set the effect of the paralysis of British trade and industry consequent on the complete stoppage of coal mining in Great Britain. That stoppage has now, according to the cables, resulted in the cessation of the British iron and steel-making industry. A cable last week stated that only one blast furnace was at work in Great Britain, and it must be plain that it will take time to get that great basic industry back into its stride after such a serious dislocation. Moreover, the effect of the three months' complete stoppage of the British coal industry is bound in other ways to manifest itself for months to come. Let us hope that by energy and enthusiasm on the part of all concerned these results may be mitigated. For us on the Rand the obvious lesson of the whole disastrous struggle is that economic laws cannot be disregarded by organised labour, however strongly united and organised that labour may be. The coal miners of Great Britain were fighting against hard facts as well as the coal-owners, and they have lost because the coal industry could not afford to let them win. In other words, they could only have their way at the cost of maiming the industry. Our economic situation is not essentially dissimilar, and the moral may be left to the thinking working men of the Rand to draw for themselves.

[Owing to extreme pressure on space we are unable to comment this week on the speech and replies of the Minister of Mines. These will be dealt with in our next issue.]

Notes & News.

May Mineral Output.

The official returns issued by the Mines Department of the Union show that the total value of the mineral output for May was £3,558,508. To this, gold at the standard price contributed £2,912,409; silver, £6,177; diamonds, £176,782; coal, 988,190 tons valued at £438,678; tin, £15,097; and other base metals, £9,365. No copper was produced or exported from the Union during the month

* * * *

Pretoria Silver Lead Co.

In the course of the metallurgist's report on a special smelting test, in connection with the Pretoria Silver Lead Company, Ltd., it was stated that the salient points of the test were that the furnace used was a roughly built blast furnace devoid of many conveniences; that the amount of ore treated was 2,480 lbs., of an assay value of 48 per cent. lead and 46 ozs. of silver per short ton; that the lead was a mixture of galena and carbonate and proved to be very nearly self-fluxing, being very soft; that the slag was very fluid and contained no prills of lead; and that as a test, and allowing for the difficulties, the results were very satisfactory

* * * *

May Gold Returns.

The monthly analysis sheet published by the Transvaal Chamber of Mines for May shows that during the month there were crushed by all the gold mines in the Transvaal 1,983,347 tons as compared with 2,020,278 tons in April. The total yield was 687,776 fine ounces as compared with 681,382 ounces for April. The yield per ton was 35s. 5d. as against 34s. 7d., and working costs were up fourpence at 26s. 4d. per ton. Average working costs for the Rand were 26s. 2d per ton. The average working profit per ton for the Rand in May was 9s. 1d. The total working profit for the month for all the gold mines of the Transvaal was £899,406, an improvement on the total of £866,129 for the preceding month.

S.A. Reserve Bank.

The subscription list of the S.A. Reserve Bank is now closed, the public having applied for between £350,000 and £400,000, the exact figure being not available. The unsubscribed balance will be taken up by the Treasury, in terms of the bank's constitution. It will be remembered that of the bank's total capital of £1,000,000, the local banks took up £300,000. The poor response made by the public to this gilt-edged issue does not augur well for the success of the new Union Government 6 per cent. loan.

* * * *

Chemical, Metallurgical and Mining Society.

At the annual general meeting of the above Society, held in the Scientific and Technical Club, 100, Fox Street, on Saturday last, the 25th instant, the following gentlemen were elected office bearers and members of Council for the ensuing year ending 30th June, 1922:—President, Mr. F. Wartenweiler (unopposed); Vice-Presidents, Prof. G. A. Watermeyer, Messrs. F. W. Watson and C. J. Gray; Hon. Treasurer, Mr. J. R. Thurlow (unopposed); Members of Council, Mr. H. R. Adam, Mr. E. H. Johnson, Mr. J. H. Johnson, Mr. A. King, Mr. H. S. Meyer, Dr. A. J. Orenstein, Mr. J. E. Thomas, Mr. J. Watson, Mr. A. Whitby, Mr. H. A. White, Prof. J. A. Wilkinson, Mr. J. A. Woodburn.

* * * *

The African Film Issue.

An issue of shares is announced by African Films, Ltd., an important subsidiary company of the African Theatres, Ltd. The African Films, Ltd. is taking over the business successfully carried on by the African Film Trust, Ltd., for £100,000 in fully paid-up £1 shares. A further £100,000 shares of £1 each is now being offered to the public by Messrs. J. W. Schlesinger & Co. The latter firm appear to be underwriting the issue for a 5 per cent. commission, and the latter firm is now offering the shares to the public at par. The proceeds of the new issue will be retained in the business for working capital, and the auditors' report shows the surplus of the company's assets over liabilities to represent 24s. 9d. per share, including this issue.

* * *

"Westward Ho!"

Our contemporary, *The Record of Klerksdorp and the Western Transvaal*, has in its issue of yesterday an interesting article entitled "Westward Ho!" which deals optimistically with the prospects of the Western gold fields. In the course of this article *The Record* states: "Under the heading of "Wanted a New Rand," our contemporary, the SOUTH AFRICAN MINING JOURNAL, drew attention to a statement recently made that, if things go on as at present, in eight years' time the Crown Mines and the City Deep only will be at work between Randfontein and Benoni, and observed that the statement was no exaggeration of a self-evident fact that will be palpably clear to all unbiassed investigators of the Rand's future." The article goes on to endorse our statement that new mines are necessary to replace the waning properties, and, after referring to the Western Rand Estate, and the recent borings at Luipaardsvlei No. 10, states: "We would point out that there exists in the Afrikander Mine over a quarter of a million tons of developed ore going 8 dwts. over a broad stoping width; that the prospecting on the Rietkuil Mines adjoining has been successful in proving satisfactory values; that at the New West Bonanza, two miles distant from these properties, a rich reef was worked and a considerable amount of gold was recovered, the work being only abandoned because the strata was badly broken and the capital to prove the reef in a more settled position was wanting. The old Klerksdorp Gold Estates proved their reef to be an enormous deposit running to 6 dwt., but lack of capital brought about a closing down of the operations. Not far removed from this property, the Klerksdorp Proprietary worked on a reef running 12½ dwt., but it was struck at a spot where it was badly disturbed, at a time when the general retreat from the west was sounded, and the property was abandoned. There is also good reason to believe that the Africander reef underlies the area between that property and Klerksdorp, but no efforts have been made to prove the theory."

The Banking View.

The Hon. Hugh Crawford, Chairman of the National Bank, made an unusually interesting speech dealing with an unusually difficult year, at the annual meeting on Wednesday. Despite the process of credit deflation that has been going on, the finances of the bank are in a sound and flourishing condition. There can be no doubt that 1920 was one of the most trying years banking in South Africa has experienced, and the banks can, on the whole, be congratulated on coming through it with so little loss to themselves and comparatively little hardship to their customers. Mr. Crawford is a firm believer in the efficacy of the embargo on gold, and he declares it cannot be removed until the premium disappears. And he certainly was able to quote concrete facts in support of his opinions. The National Bank is too closely in touch with diamond and gold industries not to be alive to the actual debacle in the former and that threatened in the latter. Mr. Crawford uttered a word of sincere warning regarding the poorer gold mines, and his view, let us trust, will weigh with the Government. For the rest, Mr. Crawford was able to infuse a note of hope and cheerfulness into his peroration which, we can only trust, will prove justified in the critical months to come.

* * *

Wages Question: The Chamber Replies.

The reply of the Chamber of Mines to the points raised by the Unions, in respect to the proposal for a wage reduction, has been forwarded to the S.A. Industrial Federation. The letter discusses the various points of criticism raised by the Unions. The Chamber denies that it has changed its front, and says "it is unwilling to believe that the unions do not intend to be reasonable in this matter." An invitation was extended by the Chamber to a conference on Thursday. In concluding the letter the chairman states: "The recent temporary rise in the premium on gold may (but only if it continued for a considerable time, which is extremely uncertain) give a breathing space for some of the lower grade mines to recover somewhat from their critical position as regards finances, whilst in other cases it may enable the continuance of a programme of development and capital expenditure with a view to prolonging their life. The Chamber emphasises that, even should gold realise temporarily the former high price, many of the mining companies will only benefit in so far as to enable them to carry out that development and expansion, or to reduce debts already incurred for that purpose. In few of such cases would shareholders directly benefit by way of an increased dividend. Moreover, the Chamber desires also to emphasise that in all probability the price realised for gold will, after the present temporary rise, fall to a point below the lowest price touched this year. In view of this it is all the more urgent that the mines should be able to take the fullest advantage of the present price in order to obtain some relief from the critical financial position in which they now are. The Chamber desires most earnestly to state that, even if the premium did revert temporarily to its former heights, that would afford no solution of the present precarious state of the industry. What is wanted, and what must be obtained, is such a substantial decrease in the cost of production as would justify a bold policy of development and expansion; and to this end the Chamber accepts the suggestion that there should be a further conference on the matter. As this matter is urgent, the Chamber will be glad to known whether Thursday next, 30th inst., will be a convenient date for a conference?"

* * * *

Natal Navigation absorbs Glencoe.

At a special general meeting of shareholders of the Natal Navigation Collieries and Estate Co., Ltd., held at the company's head office on Saturday, June 25th, resolutions for the purchase of Glencoe (Natal) Collieries, Ltd., were carried unanimously. The number of shares represented at the meeting personally and by proxy was 232,038 shares. The chairman (Mr. J. Townley Williams), in supporting the proposal, said that by virtue of these proposals the Glencoe (Natal) Collieries, as from July 1st, would be merged in the Natal Navigation Collieries, in terms of the provisional agreement already entered into. The directors had full power to enter into the agreement, and to complete the purchase without reference to shareholders, but, in view of the importance of the transaction, and its bearing upon the future prospects of the company, the directors considered it advisable to take the whole of the shareholders into their confidence and to ask for their confirmation of the agreement. It was considered that the amalgamation would be advantageous to both companies. It would make permanent and more profitable the working agreement that had controlled the shipment sales of the two companies during the last eleven years, and facilitate sales of coal and of business management, and reduce working expenses. The fusion would enable a considerable tonnage of coal to be mined and sold that would otherwise be unavailable to either company, and would give the Glencoe shareholders the benefit of a longer period of dividends through the much longer life of the Natal Navigation Collieries. In addition to acquiring the control of one of the best coals in Natal, the Navigation would derive further benefits from the acquisition of a permanent and large water supply, and, at a later date, of the plant and machinery. The chairman added that, prior to the agreement being entered into, the mine had been examined and reported upon by their own manager, and that a substantial majority of shareholders in each company had approved of the amalgamation; in fact, no dissent of any kind had been indicated to the scheme either by Glencoe shareholders or by any shareholder of the Natal Navigation Collieries. The Natal Navigation Co.'s capital is accordingly increased to £525,000, of which 83,333 shares go to the Glencoe Company.

* * * *

Mr. Bleloch and the Mines Department.

We have received from Mr. W. E. Bleloch a copy of his remarks at the Geological Society's meeting on Monday night, when the identity of the reefs on the Far East Rand were further debated between himself and Dr. Rogers, the Director of the Geological Survey. We hope to print Mr. Bleloch's remarks in full in our next issue, and deal with the remarks of the Minister of Mines on the subject in the Assembly during the week. The daily papers have printed the text of the lengthy wire sent by Mr. Bleloch to the Minister in regard to his remarks in the House. A second telegram, sent by Mr. Bleloch on Thursday, reads as follows:—

Telegram, June 30th, 1921.

> "Regret impartial inquiry which asked during past six years again refused on pitiful subterfuges screening departments officials. Have frequently informed you publicly and privately that our outcrop line Van Ryn Reef wherever opened and developed discloses payable gold like it does on every mine mining it on Far East Rand. Our reef can be inspected and samples and results compared with results from similar samplings outcrop reef from Van Ryn and Modder Mines. Rogers line of reef tested by shafts along miles of outcrop proved valueless. You say you want gold but you cannot get the gold you want unless you work the right reef. We have discovered true Van Ryn reef and have found the gold but cables you sent erroneously contradicting our geology—they never mentioned gold nor does Rogers—prevented our obtaining when it could be got the capital necessary for development into producing mines. Submit your reliance solely mere opinions official inexperienced Rand reefs ill advised. Conduct Mines Department these lines past ten years brought industry verge ruin. Grateful if will telegraph date statement Star to which you referred as containing use Dr. Rogers' name for company promotion purposes cannot find it."

The following is a copy of another telegram sent on June 30, 1921, to the Minister of Mines:—

> "Thanks for telegram giving date February 9, 1920, of Star stated by you on information conveyed to you in letter from director to certain statement in which I openly and publicly used director's name for purpose leaving impression that director agreed my views. Statement in Star you refer to contains no mention of director or any official opinion whatever on your own evidence; therefore cables were sent on false information supplied to you; trust you will inform Parliament of the truth. Your statement that I did not go to London to raise money for Southern Van Ryn is incorrect; I went there specially for that purpose and had made arrangements for a large amount of working capital which the cables destroyed; company never had hundreds of thousands of pounds as you allege and Government has taken £30,000 of its capital in taxation."

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Engineering.

The Electrification of the Swiss Railways.—The Engineer. May 27, p. 563.

Heat Losses in Power Plants.—The Enginess. May 27. p. 571.

Economic Aspect of Railway Electrification.—The Engineer, May 27, p. 576.

Rebuilding Worn Machinery Parts.—Iron and Coal Trades Review, May 27, p. 724.

The Application of Electrical Machinery to Measure Production in a Mine.—Iron and Coal Trades Review, May 27, p. 730.

Coal.

Coal Cutting Machinery.—Iron and Coal Trades Review, May 27, p. 720.

Economics.

The Effects of War on Industrial Unrest.—The Engineer, May 27, p. 723.

The Present Economic Position of the Engineering and Allied Industries.—The Electrical Review. May 27. p. 694.

Losses of Coal in Mining.

It is well known that the lost coal left in the ground in mining, under such conditions that recovery is practically impossible, constitutes a large proportion of the coal in the beds worked. A recent estimate in a paper on "The World's Fuel Supply," presented by Professor L. P. Breckinridge, of Yale University, before the annual meeting of the American Society of Mechanical Engineers, places the average loss in bituminous coalmining as one-third left in the ground. The bald statement that there is a loss of one ton of coal for every two recovered may seem to those not familiar with coalmining to imply inexcusable and wanton waste, says Mr. George S. Rice (chief mining engineer, United States Bureau of Mines) in an article on "Some Factors Affecting Losses of Coal in Mining." Perhaps a better way of expression is in terms of total recovery rather than in terms of losses. Many mine superintendents and mineowners will readily concede that their total recovery may be only 60 to 75 per cent., but to state that they are wasting 25 to 40 per cent. arouses antagonism. The suggestion is of wilful waste, whereas the majority of the operators try to the best of their ability to get a high recovery under the adverse and complex conditions that confront them. These involve natural, commercial and labour conditions, and the requirement in many cases of boundary pillars under railroads and buildings, which may be called for in the deed or lease, or in the absence of specific exemption in the deed or lease the common law requirement that a surface owner is entitled to the support of the surface. Besides the natural conditions there are three other important factors—namely, machine mining, labour situation and excessive competition—all of which tend to increase losses in mining. It is perhaps not generally appreciated by those not familiar with the details of coalmining that machine mining, which includes undercutting machines, and in some mines loading machines, does not lend itself to a high recovery, and over 55 per cent. of the bituminous coal is now mined or undercut by machines. This adverse condition, which arises from the fact that machines are not suited to coping with irregularities in coal beds, is one of the chief reasons why mining machines have not been more extensively used in Europe, where, contrary to the belief held by most mining men in this country, underground operations are on the average characterised by better engineering than they are in America, the low production per man in Europe being largely due to difficult natural conditions. For example, were the mines of Belgium and Northern France in the United States it is doubtful whether they would be worked at all, or that miners would be willing to perform the relatively difficult labour in such thin irregular beds."

ANSWERS TO CORRESPONDENTS.

J. D. Henderson. -(1) We should say that there is such a possibility. (2) We cannot give share market tips. (3) For position of this mine see our last issue.

A. W. WEATHERBY (Kimberley).—Write to Mr. Van Tijn, c.o. Cott's and Co., High Court Buildings, Johannesnesburg.

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The Central Mining Report.

ACCOUNTS SHOW A PROFIT OF £390,283.

THE CONSULTING ENGINEER'S STATEMENT—A MODEL REPORT; INFORMATIVE AND COMPLETE—MR. MARRIOTT ADHERES TO STANDARD PRICE AND PREVIOUS PRACTICE.

We have received from the Central Mining and Investment Corporation, Ltd., a copy of the full report of this important controlling group for the year 1920. After dealing with the economic position obtaining in national industry and international trade generally, the report goes on to review the South African business of the Corporation, and states:—

The profits earned and dividends declared by South African gold mining companies in respect of the past year were eminently satisfactory, thanks to the high average price received for gold. Mining expenses were again higher than in the previous year, both wages and the cost of stores and materials showing further increases. A reaction in the price of supplies set in some months ago, and it is confidently expected that not only in this, but in other directions as well, economies in working will shortly be effected. A Bill is at present before Parliament to abolish the taxation imposed on the mining industry by the Transvaal Provincial Council. The native labor spply was insufficient during part of the year, but latterly the active mines have been fairly well provided for, as the total requirements of the Rand have grown less, owing to the exhaustion of some mines and the closing down of others which cannot be profitably exploited while high working costs prevail.

The Enemy Share Holdings.

The market in gold shares, apart from following the general trend of affairs, has, of course, been under the additional influence of the fluctuations in the price of gold. The invitation for tenders by the Union Government of South Africa for the large blocks of shares formerly held by subjects of enemy States had a somewhat depressing effect. Similar, though smaller, holdings are controlled by the Public Trustee in this country. The desirability of all these interests being dealt with, and simultaneously if possible, is fully recognised, but the accomplishment of that end can only be attained by a common agreement between the Governments concerned.

During the early part of last year the Corporation's holdings in short-lived gold mines was further reduced; those in other affiliated South African interests, particularly in New Modderfontein, Ltd., and the Transvaal Consolidated Land and Exploration Co., Ltd., have on balance been increased, and a shareholding has been acquired in the Anglo-American Corporation of South Africa, Ltd., as against realisation of shares in some of the subsidiaries of that Company. Geological and exploratory work was carried out in various coal areas in South Africa, resulting in the purchase of an important property in the Middelburg district of the Transvaal in the neighbourhood of the Witbank Colliery, and the discovery of promising coal seams on other farms in which you are interested in the same district.

Part of your holding in diamond shares was sold at high prices, and has not yet been replaced. On the other hand, your Corcoration is, as you know, interested in the Diamond Syndicate, which at present holds a considerable stock of diamonds. The Syndicate's agreement with the producers has, in the recent trade depression, exercised a steadying effect on prices, and will in due course greatly facilitate a return to normal conditions.

Broken Hill.

Notwithstanding the severe depreciation in the price of lead—a depreciation common to all base metals—the Rhodesia Broken Hill Development Co., Ltd., has been able to avoid the expensive necessity of temporarily ceasing work at a time when similar mines in all parts of the world were forced to close down. This was no mean achievement. Lead has recovered to a price which, although comparatively low, leaves a fair margin of profit, and the monthly output from the mine has steadily increased until a figure of over 1,800 tons was reached in April.

Accounts.

The accounts show a profit of £390,283 11s. 5d., to which has to be added the net amount brought forward from the 31st December, 1919, £145,259 3s. 4d., making a total of £535,542 14s. 9d.

Consulting Engineer's Report.

The report of Mr. Hugh Marriott, the company's consulting engineer in London, follows. This is a lengthy and informative refiew of the results secured by the mines under Central Mining control. The report makes a distinct differentiation between gold at standard price and the ephemeral and fluctuating premium value. Mr. Marriott bases calculations on gold at the standard price, and adheres to the practice adopted in previous reports. He gives the following statistics of results secured by mines under the group's control:—

A Great Central Mining Proposition: The New Modderfontein.

	1919.		1920.	
Tonnage milled .	10,587,638	—	11,327,312	—
Revenue from gold won (at standard price)	£15,793,343	29.83s.	£15,879,251	28.04s.
Working expenditure...	£12,809,520	24.19s.	£14,911,835	26.33s.
Working profit (exclusive of premium)	£2,983,823	5.64s.	£967,416	1.71s.
Additional revenue from sales of gold above standard price	£1,616,254	3.06s.	£4,913,764	8.67s.
Total revenue ...	£17,409,596	32.89s.	£20,793,015	36.71s.
Working profit inclusive of premium)	£4,600,076	8.70s.	£5,881,180	10.38s.
Dividends decl'ed	£3,128,142	5.91s.	£4,280,336	7.56s.

The proportion of the results obtained from the Witwatersrand goldfields attributable to the group is shown by the following table:—

	Group proportion of Total.	
	1919. Per cent.	1920. Per cent.
Tonnage milled .	44.0	47.0
Yield	46.0	47.8
Costs	46.5	48.4
Working profit ...	44.0 (or 44.7 with premium)	40.0 (or 52.0 with premium)
Dividends declared	54.6	51.7

Thirteen out of the twenty companies attached to the group paid dividends. The City and Suburban, New Heriot and Village Main Reef mines closed down during the year.

Ore Reserves.

The ore reserves of the group, as calculated at the close of the financial year of each company, were:—

	Tons.	Average gold content. Per ton.
Ore blocked out and available for stoping, 1919	36,992,919	30.8s.
Ore blocked out and available for stoping, 1920	35,402,311	30.6s.

This now represents an average of 2.9 years' supply for the mills on measured ore reserves alone, based on the tons milled during the year under review. Ore contained in shaft, safety and boundary pillars is given in the subjoined detailed statements for each company.

The total supply to the mills was obtained from the following sources:—

Measured ore reserves	... ...	69.9 per cent.
Reclamation work	... ...	24.2 .. ..
Development	... ...	5.9 .. ..

Following the practice adopted in previous reports where. in statement of ore reserve value and gold production an allowance of 1s. per fine ounce was made for the oest of realisation. the figure of 84s. per ounce. or 4.2s. per dwt. has been adhered to in place of the standard figure of 85s. per ounce.

During 1920 the realisation charges were subject to wide variation. and the average for the year was approximately 2.7s. per ounce. The remainder of the realisation charges has been deducted from the revenue obtained from the sale of gold above standard price. and the net return is shown as a separate item of profit throughout this report.

The average rate of sorting for 1920 was 9.0 per cent., and the average gold content of the waste was 2.2s. per ton. Taking the proportion of rock discarded as waste in 1920 as the basis, the ore reserves represent 32,216,102 milling tons of a calculated gold-content of 33.5s. per ton

The mines of the Group have a total maximum crushing capacity of 13,758,000 tons per annum.

The amount of ore treated was 80 per cent. of the available capacity of the plants, being an increase of 6 per cent. over the corresponding figure of the previous year.

The average results from mining operations for the Group were as follows:—

	1919. Per ton milled.	1920. Per ton milled.
Average yield (calculated at standard price)	29.7s.	28.0s.
Average additional revenue from sale of gold above standard price	3.0s.	8.7s.
Average working cost, inclusive of all current expenses incurred by the Companies except taxes	24.3s.	26.8s.
Average Taxes	1.4s.	1.4s.
Average net resultant profit from tonnage milled (exclusive of premium	4.0s.	.2s. (loss)
Do. (inclusive of premium)	7.0s.	8.5s.
Average net profit from other sources	.4s.	.6s.
Average amount of dividends paid	5.9s.	7.6s.
Average amount re-invested on capital account as nearly as can be ascertained	1 2s.	1.2s.

The amounts carried forward by the various Companies show a total of £3,380,324, equivalent to 6.1s per ton milled, as against 6.3s. per ton milled for 1919.

It should be noted that the profit stated in this table and in similar statements of "net resultant profit" in the detailed summary of results of the various Companies given below is the net cash profit obtained from the tonnage milled, exclusive of any other revenue. which is available for dividend purposes and, where required, for reinvestment in improvements in the mines to provide increased capacitl in the mine or plant, or in increased claim area acquired on an annuity basis or otherwise.

The taxes stated in this table and throughout the report do not indicate any rise or fall in taxation. but are included solely to show their bearing on the value of the yield per ton treated during the year under review.

Taking the yield together with the assay returns of the residues as representing the total gold-content of the ore milled, this is thus calculated as 29.4s. per ton milled. The average rate of extraction on this vasis is 95.5 per cen., and the original gold-content of the ore mined 26.9s. per ton mined.

These reports have now been issued over a period of ten years presenting a series of annual records of the results obtained by the Group on a strictly comparable basis. Gold has been reckoned at standard price throughout.

Working Costs.

Costs —The subjoined detailed summary of the results obtained by the various Companies shows that. calculating the returns on the standard gold basis of 84s. per oz.. twelve out of the nineteen Companies show a loss on the year's operations. The additional revenue obtained from the enhanced sale price of the gold produced enabled all the mines which are now working to show a final profit on the year's returns. Two mines finally ceased operations owing to their inability to meet their expenditure notwithstanding the increased revenue. In order to ascertain how far this unstable that has taken place during the last five years. The deposition can be remedied and a reversion effected to a more stable basis, it is necessary to analyse the increase of costs velopment of the variou increases in cost is shown under the different headings in the following table —

DIRECT WORKING EXPENDITURE AT THE MINE.—(Exclusive of Charges not under the Control of the Management).

Year.	Wages. European.	Wages. Native.	Materials.	Other Costs.	Total.	Tons Milled.
1914	-	--	—	—	17/1.7	9,531,000
1915	4/9.6	3/10.8	5/8.3	3/2.1	17/6.8	10,405,000
1916	4/11.7	4/1.6	6/0.9	3/3.4	18/5.6	10,156,000
1917	5/7.1	3/10.6	6/4.9	3/9.3	19/7.9	9,359,000
1918	6/8.2	4/2.8	7/6.6	3/7.1	22/0.7	12,005,000
1919	7/4.6	4/2.3	7/10.3	3/11.1	23/4.3	11,267,000
1920	8/6.4	4/6.1	8/5.3	4/4.9	25/10.8	11,028,000
Month December, 1920	9/2.4	4/9.6	9/2.4	4/1.7	27/4.1	867,000

It is here seen that there is a moderate increase in native wages which in December, 1920, reached their highest point —4/9.6 per ton mileld. The small increase noted calls for no comment.

In the comprehensive item of "Other Costs" an increase is shown of 39 per cent. during the past five years, and this is due in part to fresh charges on the industry owing to additional benefits having been given to European labour.

The increase shown of 61 per cent. in the cost of materials may be considered in part a temporary burden from which some relief is already being obtained, and it is fair to assume that a considerable reduction in this item will take place when normal trade conditions are re-established.

The European wages show an increase of 92 per cent., which is out of all proportion to the remainder of the increases noted, and the anomalous position has been created that the total cost to the industry of the European employees who largely act in a supervisory capacity and constitute one-eighth of the total labour force, is nearly double the whole expenditure on the native labourers who carry out the work. It is evident that this item of cost of European labour must be considerably reduced if the mines are to continue in successful operation. Any successful re-organisation of the present system of underground work must of necessity include the amendment of the onerous and obsolete mining regulations which unduly restrict the hours of work of the native labourers to as little as five hours daily, and prevent their legitimate development to higher classes of work. The attainment of the reductions of cost here indiacted will, apart from other possible sources of increased profit, go far to re-establish the stability of the industry, and will in turn induce the enlargement of the scale of mining operations, and thus afford increased scope for legitimate application of European labour in the mining industry and in kindred commercial undertakings.

Oil in the Bethlehem District.

Mr. Hall's Paper on an Important Discovery.

At the monthly meeting at the Geological Society of S.A., held on June 27th, Mr. A. L. Hall, the Assistant Director of the Geological Survey, read a paper entitled "On the occurrence of Oil on Madrid No. 281, in the Bethlehem District of the Orange Free State." This farm lies some 30 miles south of Bethlehem, and recent prospecting operations have located a deposit of crude oil in Basalt; the oil is a dark brown tarry liquid with the following promising compostion:—

Up to 150 C (Naptha)...	Trace.	
150 C to 300 C (Kerosene)... ...	30.1	per cent.
Above 300 C (Lubricating Oil)	43.9	,,
Residue (Coke and Carbon) ...	26.0	,,

Mr. Hall gave the following summary of his discussions:—

1. On the top of the horizontally bedded cave sandstone, at an elevation of approximately 6,360 feet above sea level, rests a stratum of amygdaloidal basalt which can be traced across Madrid and several neighbouring farms.

2. This basalt has a proved maximum thickness of 42 feet on Madrid, where it has been shown to be oil bearing, the "oil" occurring in scattered pockets of a dark brownish black tarry liquid.

3. The impregnation of the basalt belongs to a period subsequent to that of the formation of zeolite, and one effect has been to partly or completely alter the minerals originally filling the vesicles into a black amorphous mass, bearing a general resemblance to coaly matter. Certain phases of the resulting rocks are unique.

4. These oil indications are secondary and most likely due to the natural distillation from oil shale by vertical basic dykes.

5. It is probable that the district is underlain by one or more oil shale horizons; that of Impendhle County would be at a depth of; roughly, 1,000 feet below the cave sandstone.

6. The formations met with belong to the Stormberg series, are very regularly and almost horizontally bedded, and in the total absence of folded structures the chances of striking artesian oil wells are remote.

7. In its essential features the Madrid occurrence corresponds to similar phenomena known from a number of other localities, but the scale of impregnation appears to be greater than any hitherto recorded.

The Position at the Luipaardsvlei Estate.

During the month of May the Luipaardsvlei Estate milled 20,770 tons of ore, at a cost of £23,710, for a gross return of £24,112. This meant a net average profit of fivepence per ton milled, taking the realisable value of gold at £5.1875 per fine oz. The parlous plight of the company has, of course, been patent to everyone for some time back, and the directors last week again held a conference with their employees, when the whole position was explained in the simplest language. Unfortunately, the men were not able to come to any decision on the spot, as they deemed it necessary to consult the Union officials, but it is permissible to hope that the latter, in view of the particularly criticial position at this mine, will allow the men the fullest latitude in dealing with the management, in order that the mine may be kept working. The only alternative, of course, is closing down, with its concomitant of unemployment and distress.

* * * *

A Cornish View of Rand Mine Staffs.

In a contribution read at the annual meeting of the Chemical, Metallurgical and Mining Society of South Africa, held in Johannesburg last Saturday evening, Mr. Alex. Richardson (a past President), writing from Camborne, Cornwall, referred to miners' phthisis and to the supply of trained mining assistants for the Rand. Among the 14 countries to which Camborne students had gone in recent years, said Mr. Richardson, South Africa occupied only tenth place in order of attractiveness. The reason for this avoidance of a great mining field was that other countries guaranteed a period of employment of from 18 months to three years and travelling expenses to the mines, while South Africa did not. "One can hardly expect young fellows to spend £100 or so in going out to look for problematical employment with the off-chance of being turned down by the Phthisis Board, and having to spend another £100 to get back again. If South Africa is really anxious to obtain recruits for its mine staffs, a little imitation of the procedure followed in other countries will soon produce them."

Letters to the Editor.

RAND MINERS' WAGES.

A Suggestion from Rhodesia.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—In regard to the proposed reduction in the wages of the Rand miners, cannot the more responsible leaders of the men suggest and adopt some other method of forcing an issue than by putting heads down and running blindly against the wall?

Why cannot the men form Syndicates or a Syndicate; contribute as much as they can of their earnings towards a general fund to buy up shares of the mine on which they may be working, accept the reduced wage and endeavour all they can to put up the output of their particular mine. With the price of gold at its present level or even at £5, the return on their contributions should more than make up the reduced wage, and all the time their holdings will be appreciating.

Much more sane way this than putting their spare cash on a " Stiff 'Un."

It is all very well for the leaders of the men to kick against Capital. SAVINGS (Capital if you like) in the great majority of cases is the result of abstinence, thrift and honest labour, and deserves an adequate return for its conscientiousness and denial.

Let the miners themselves, through their Syndicates suggested above, become capitalists in a small way. They will then take an interest in their work and be the less prone to follow the ravings of the extreme section of their leaders; actions and ravings, the deplorable result of which we have seen in the unhappy state of Russia and more particularly of Russia's working men.

Yours, etc.,

SANE ACTION.

Salisbury,
24th June, 1921.

WESTERN RAND DISCOVERIES.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—The news which at long last is published to the effect that the Buckshot Leader has been located in the neighbourhood of Krugersdorp is most satisfactory.

All old residents of the Rand who took any particular interest in mining will recall what a commotion was caused when some of the samples were exhibited, which had been found on the Rietfontein Estates property.

If my memory serves me rightly, the Rietfontein series included the Buckshot Leader, the Carbon Leader, and the Stable Reef, the Carbon Leader being the one that carried the phenomenal values. As its name implies, this occurrence was a narrow, black leader of unprecedented richness, some of the assays running, as far as I remember, to over 700 ounces to the ton.

The Leader was followed down and worked until the soapstone beds were reached, but then it petered out, and, though very large sums were spent in prospecting for it, yet it was never found again in the neighbourhood.

Most people thought that the series had never been picked up anywhere, but in this they were wrong, for one Saturday, some fifteen years ago, it was located by a couple of determined and capable men, who had long been on the quest.

Why I know that it was on a Saturday was because that —Saturday evening I met one of them at a Johannesburg Club, and there, over the usual whisky and soda, he told me with great elation of his success of the morning.

My informant was none other than the late Dr. Carrick, who so soon afterwards went down with the ill-fated " Waratah," and who was one of the most capable, practical geologists, and one of the finest fellows that ever lived.

It is only during the last few days that I have learnt what actually happened. It appears that Mr. E. Kumst was the man who was with Dr. Carrick on the occasion mentioned, and they were prospecting on " Zwartkop," a farm lying about a dozen miles to the north of Krugersdorp. Some time before the Boer War a London company had driven a shaft about 200 feet into a hill and had intersected the Buckshot Leader, though they never discovered the fact. In due course the company ceased operations and went into liquidation—it appears that they could not secure transfer of the farm—and nothing more was done until 1906, when Messrs. Carrick and Kumst rolled up and decided to examine the drive.

This led to the discovery, for they had only gone a very few feet when they located the leader. The blasting had badly shaken it up at the sides where they first noticed it, so they looked for it under the floor, where it was at once disclosed. Transfer was still unobtainable and so the two discoverers kept the matter dark.

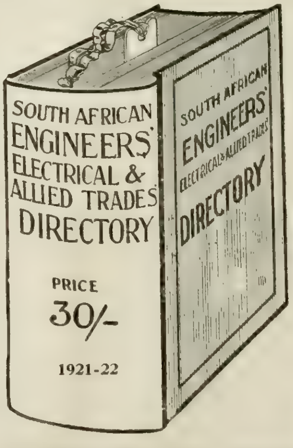
If the Western Main Reef Company succeed in opening up the whole of the series, and if it carries anything like the same values as were found on the Rietfontein Estates, then it will be a jolly good thing not only for the Rand but for the whole of South Africa.

A. ROBERTSON.

52, Cornelia Street,
Troyeville, Johannesburg.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—What gloomy and sorry reading your issue of the 18th inst., on the decline of the mining industry, is made up of. As one who knows a little of the stratigraphy of the various systems making up the geology of the country with their respective and various mineral possibilities, I fail to see any but imaginary signs of an impending catastrophe. No room for pessimism in this fair country of ours, carrying more minerals to the square yard than any other country to the square mile. Where the carcases lie the vultures gather, and as we are blest by having the goods, Johannesburg will not dwindle to the insignificance of a dorp, but will continue fulfilling its destiny of growing and developing into the largest, wealthiest and most prosperous city south of the line. This happy and desirable consummation, Mr. Editor, is not going to be brought about by the bee in the bonnet class of theorists, or self-styled geologists and stratigraphists,



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who even in this stage of the world's progress fail to identify Randfontein Series, Blue Sky Series and Van Ryn Series as the one and self-same Main Reef Series.

I maintain, sir, that the prospect of opening up of new and profitable ventures in the Lower Witwatersrand System is absolutely hopeless, and any prospecting in these beds should be strongly discouraged as a blind waste of good time and money on a wild cat scheme.

You advocate a thorough unbiassed and competent investigation into the merits of the reefs underlying and overlaying the banket beds of the Main Reef Series. Such an investigation had been undertaken some years ago by the Government Geological Survey, under the able supervision of South Africa's premier geologist, Dr. Mellor; and as one who has devoted years of my lifetime to the investigation and correlation of the different beds of both the Lower and Upper Witwatersrand System, I can add my tribute and testimony, "as I had already done in the past," to the splendidly correct interpretation and correlation of the beds and the thorough manner in which it had been carried out, admitting no room for doubt or misreading.

It is where some of our self-styled geologists in their blindness and imaginary superior knowledge run counter to the well-established and proved facts, that Government interference in private enterprise becomes wholesome and justified. The Witwatersrand System beyond the Nigel justified no further prospecting, and the Government, by interfering, did Mr. Bleloch and his friends the most kindly and charitable act imaginable.

I have no doubt but that the Government will act as charitably and sympathetically towards another undaunted and well-meaning geologist, who is about to appeal to the public. How has one to account for the vagaries and the inconsistencies of the Government officials. To the one prospector they are callous, brutal and even tyrannous, vide Mr. Bleloch; to the other, as I have found them to be, courteous, willing, helpful and sympathetic.

Cheer up, Mr. Editor, the Main Reef is not the only pebble on the beach. The near future will prove there are better times in store.

S. D. HAYLETT.

[We have altered one or two paragraphs, which would only cause bad feeling, in our correspondent's letter. As to ourselves, we are not aware that we have lent support to any particular wild cat. We have merely pressed for the thorough exploitation of the whole Rand series.]

Quite a promising coal mine has been discovered at Maclear by Messrs. Potgieter Bros., says the "East London Dispatch." The seam is narrow so far, but inclines to broaden the deeper it is worked. It adjoins the village. The quality of the coal is good.

Union Mineral Projects.

The Brussels correspondent of "The African World" writes in its current issue:—"I am reliably informed that the Union Miniere is at present negotiating with the Colonial Office concerning the erection of the new great hydro-electric works required for the copper leaching process. The completion of these works—which will not be built at Ruwe, but elsewhere—will require about 100,000,000 frs. "The Unon Miniere would like these hydro-electric works built and operated by a subsidiary company, but the Colonial Minister—Mr. Franck—is not favourably inclined towards this suggestion. If Mr. Franck persists in his views, the Union Miniere will have to increase its capital (at present only 15,000,000 frs.). Nothing has, however, so far been decided as to this capital increase. It must be remembered that when, some months ago, the Union Miniere decided to make an issue of seven per cent. bonds to the value of 40,000,000 frs. it only issued to a value of 20,000,000 frs."

Review.

"*S.A. Engineers' Electrical and Allied Trades Directory*, 1921-22. Published by the *S.A. Mining and Engineering Journal*. Price, 30s.

The new edition of this valuable work was issued this week. As its increased bulk indicates, the Directory includes a number of new features, and is in many respects a great advance on its predecessor. Perhaps the most valuable section is the complete directory of the mines of the Union and Rhodesia. This, like the other portions of the work, has been revised down to date, and is the only reliable specialised directory of its kind in the country. Not only in point of size, but in the accuracy and comprehensiveness of its contents, has the work been enlarged to meet the needs of the ever-growing number of those whose interests it serves. The chief features of the book are the alphabetical section, which deals with 1,500 firms, and classifies with greatest accuracy the whole personnel of the various trades, providing numerous cross-indexes showing at a glance the firms and companies engaged in all or any of the various trade or industrial categories. This section gives all the essential particulars of all the various firms, including postal, telegraphic, and cable addresses, telephone numbers, the names of the partners (if any), and the agencies represented. In the case of trading companies it gives the capital, directors, and other information necessary to a correct reading of their business position. The geographical section segregates the firms in the different centres throughout South Africa, and provides a complete list of the businesses in each town falling within the scope of the work. The list of overseas agencies held by South African firms comprises over 1,500 entries, and forms a valuable feature. The "Buyers' Guide to Engineers' Specialities" provides a list of all the suppliers of all the manifold requirements of the engineering, electrical, constructional, automobile, and mining material trades. Exhaustive lists of professional, consulting, mining, railway, irrigation, municipal, and P.W.D. engineers and officials enormously enhance the value of the work. The volume, which runs to upwards of 600 pp., is beautifully printed and produced by the Argus Co. in blue cloth boards, with gold lettering, and is published from this office.

Transvaal Estates and Development.

With a reduction in "stated income" of £5,000, the accounts of the Transvaal Estates and Development Company for 1920 show an expansion of nearly £10,000 in net profit at £26,700. The explanation of this apparent anomaly centres around the question of depreciation. For 1919 nearly £19,000 was written off the investments. Last year, although a further shrinkage in values to the tune of £46,100 occurred, no allowance was made, the Board considering this course justified by the fact that the deficiency is "more than covered by the ascertained value of the Company's asbestos deposits, which value does not appear on the face of the accounts." Moreover, about one-quarter of the depreciation has since been recovered. As the dividend of 2½ per cent. absorbs all but a comparatively small amount of the 1920 earnings, it follows that the payment of a like rate for the previous year entailed a tolerably heavy draft upon the carry forward. The investments (mostly gilt-edged) at market prices of the 31st December represent £320,000, or about 6s. 6d. per share. Estates and expenditure thereon figure for a much larger additional sum. As to the general operations of the Company, it is intimated that while work on the coal property has been in abeyance, an option was secured over an adjoining property, into which the seams appear to run. A more advantageous agreement has been made with the tributors of the valuable asbestos deposits in Sekukuniland.

RHODESIAN SECTION.

The Minerals of Northern Rhodesia.

COPPER, LEAD, ZINC, BISMUTH AND MICA OCCURRENCES.

Northern Rhodesia differs markedly from most parts of Southern Rhodesia in its geological features, and this fact is reflected in its mineral resources. The so-called "schist areas" or "gold belts" which occupy much of this country are not represented north of the Zambesi to any extent, if at all, and though the object of extensive prospecting very little gold has been discovered.

Copper.

From the first copper has attracted a larger share of attention, and although the actual production has not been great, it is quite probable that it will take a much more important place in the future than might be anticipated from the past. Two mines of considerable size have been developed, the Kansanshi and Bwana Makubwa, both close to the Congo border, and to these may be added another of some importance in the Sable Antelope, near the Kafue River, which has been the most profitable concern of all, though it owes its success to the tributor. It is scarcely to be supposed that with so many prospects spread all over the country there are no other workable deposits, and with the confidence that skilled metallurgists would inspire, some of these could be successfully opened up even now. It is want of metallurgical skill rather than anything else which has kept things back, not only in the case of copper, but some of the other metals as well.

Lead.

Up to the present lead has been the most largely and profitably worked metal, though as it happens the only deposit is that of No. 1 Kopje at Broken Hill. It occurs there as a large mass of high-grade carbonate, in dolomite country, and is associated with zinc ores, which are dumped for future treatment when the exigencies of mining make it necessary to extract them. The ore is smelted direct as it comes from the mine, without any crushing or concentrating, and the chief difficulty which has to be overcome is not in the treatment, but lies in the enormous quantity of water which has to be pumped in order to allow of mining being carried on. It is said that 250 tons of water have to be lifted to the surface for each ton of ore mined.

Zinc.

In the immediate fuutre zinc is likely to become the most important product of Northern Rhodesia. Like lead, it is not known outside the limits of the Broken Hill Company's area, but not only is it found in quantity at No. 1 Kopje associated with the lead ores, but it forms the bulk of No. 2 Kopje, and other deposits which are free from lead. The tonnage already developed is very large (515,000 tons of 25 per cent. ore was the figure given at the Company's last annual meeting), and when the projected plant for electrolytic zinc production gets under way, Broken Hill bids fair to become quite a hive of industry. This will be helped by the fact that the ores contain a very valuable by-product in the shape of vanadium, a metal now much in demand for steel alloys used in aeroplane and motor car construction. Of this useful substance Broken Hill has the only really important deposits apart from those of the American Vanadium Corporation in Peru. At present the high-grade vanadium minerals are sorted out in the course of mining the lead ores, and are shipped to America, but when the zinc plant is installed it is anticipated that vanadium will be produced on a much larger scale from the lower grade material. It is a remarkable fact that so far as is known there are no other zinc, lead, or vanadium deposits anywhere in Northern Rhodesia outside Broken Hill. Considering the large areas of similar country which exist, it seems only reasonable to suppose that others will be developed as time goes on, and the same may be the case in the north-eastern part of Matabeleland and the north-west of Mashonaland, where conditions are much the same.

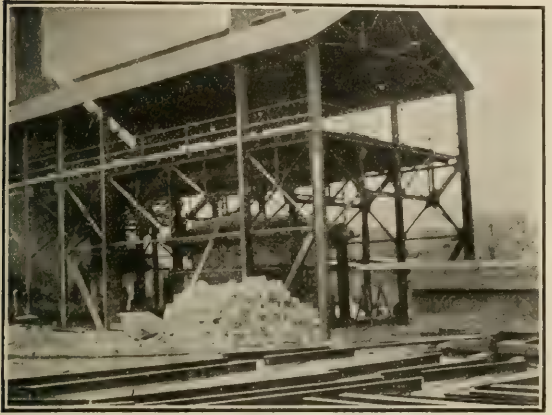
Rhodesia. Broken Hill: a General View.

Bismuth.

Bismuth, which is another interesting mineral product of the territory, is much more widely distributed, especially on the highlands which overlook the Luano flats. Much the largest deposits are said to be those of the Tanganyika Concessions, which have not had any development work done on them, but good-sized parcels of ore have been marketed from other claims. It can scarcely be doubted that bismuth will attract further attention in the future, especially with the growth of knowledge of the treatment of low-grade ores of this valuable metal. Some of the bismuth deposits contain gold; indeed, the present gold output comes almost entirely from claims where the precious metal is associated with bismuth ores.

Mica.

If one adds mica to the minerals above referred to, the list of actual products becomes practically complete. The mica comes from the granite country east of Pemba, and other deposits have been prospected, though few have turned out of good quality. Potentially Northern Rhodesia has mineral resources of considerable value in other directions. The coalfields along the Zambesi and several of its principal tributaries are very extensive, and though the quality of the coal is not always of the best, it cokes well. Furthermore, even the very ashy coals are highly bituminous and are likely to prove of value for the extraction of volatile by-products as the country becomes opened up. Moreover, the iron resources of the territory are very considerable though the ores are quite unlike those of Southern Rhodesia. Large deposits of massive crystalline haematite are numerous in the country north of Mwomboshi right away to the Congo border, and though their present value is small, it will become rapidly greater as the country is settled and the population increases.—"Bulawayo Chronicle."



The Smelting Plant at Broken Hill, Rhodesia.

* * * *

The Rezende.

The report of the Rezende Mines for 1920 shows revenue from bullion recovered £129,578; withdrawn from bullion reserve account, £12,977; premiums declared, £19,050; from other sources, £3,000; total, £164,605. Working costs, £93,058; London and Salisbury office expenses, £3,091; audit fees, £150; depreciation, £10,100; Rhodesian income tax, £10,617; directors' fees, £800; extraordinary expenditure written off, £5,092; total, £122,908, leaving a balance of £41,696, plus £48,201 brought in. In addition, bullion value £3,414 was realised, proceeds being placed to reserve, and premiums in excess of monthly declarations amounted to £24,705 (of which £4,684 belong to 1919). Dividends Nos. 13 and 14 and directors' additional remuneration absorbed £50,400, and balance of expenditure under Kent option amounts to £4,977, £34,519 being carried forward. Ore reserves—140,268 tons, value 10.0 dwts., compare with 165,248 tons, value 10.72 dwts. They have, however, been revalued on a more conservative basis. A final dividend is not recommended; total paid for year is therefore 40 per cent.

Nobel Industries, Ltd.

The decision of the directors of this undertaking, which has extensive interests in this country, to carry out a policy of conserving cash resources, rather than paying dividends, came in the nature of a surprise, but the shareholders will hardly fail to recogise the soundness of their attitude in the present condition of trade. It is stated that sufficient particulars have now been received from the constituent companies of the trading results for 1920 to indicate that the profits for that year will not be less than those of the preceding year. Despite the satisfactory character of these results, the directors consider that in view of the serious position in the coal mining industry, upon which many of their factories are so dependent, and of the impossibility of judging how long present conditions arising therefrom may last, it is necessary to conserve resources in every way and not to make such distribution of profit as would in normal circumstances be justified. Instead of recommending the payment of any dividend on the Ordinary shares, therefore, the whole available balance of profit is to be carried forward to the year 1921. The Preference dividend due on August 1st next will be paid in the ordinary course of events.

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The Half Years' Dividends

DECLARATIONS TO DATE.

The following are the gold mining dividends for the half-year ended June 30, declared up to the date of going to press. For purposes of comparison the dividends for the corresponding half of last year are included.

Witwatersrand Gold Mines.

	Date.	Rate per cent.
Brakpan Mines	June, 1920	15
	June, 1921	15
City Deep	June, 1920	12½
	June, 1921	20
Consolidated Langlaagte ...	June, 1920	5
	June, 1921	5
Consolidated Main Reef ...	June, 1920	6¼
	June, 1921	3¾
Crown Mines	June, 1920	27½
	June, 1921	10
Ferreira Deep	Mar., 1920	10
	Mar., 1921	7½
Government G.M. Areas ...	June, 1920	20
	June, 1921	25
Geduld Proprietary	June, 1920	7½
	June, 1921	7½
Langlaagte Estate	June, 1920	2½
	June, 1921	5
Meyer and Charlton	June, 1920	50
	June, 1921	50
Modder B.	June, 1920	32½
	June, 1921	40
Modder Deep	June, 1920	60
	June, 1921	65
New Modderfontein	June, 1920	45
	June, 1921	42½
New Primrose	June, 1921	5
New Unified	June, 1920	5
	June, 1921	5
Nourse Mines	June, 1920	3¾
	June, 1921	2½
Robinson	June, 1920	5
	June, 1921	1
Rose Deep	June, 1920	10
	June, 1921	7½
Springs Mines	June, 1920	5
	June, 1921	7½
Sub-Nigels	June, 1920	5
	June, 1921	3¾
Van Ryn	June, 1920	7½
	June, 1921	7½
Van Ryn Deep	June, 1920	25
	June, 1921	30
Village Deep	June, 1920	2½
	June, 1921	3¾
Witwatersrand	June, 1920	5
	June, 1921	10
Wolhuter	April, 1920	6¼
	April, 1921	3¾
Wit. Deep	June, 1921	5

A full and complete list, with comparative totals, will be given next week.

Concerning Mines and Men.

Mr. F. R. Lynch left this week for London on a four months' trip.

* * * *

Mr. J. J. Wessels has joined the firm of McLove, Haggie & Co., Ltd.

* * * *

Amongst important mining men now resident in England who may be visiting the Rand in the near future, we hear mention of the names of Mr. R. W. Ffennell (Director) and Mr. Hugh Marriott (Consulting Engineer), of the Central Mining-Rand Mines Group.

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The Week in the Sharemarket.

EFFECT OF COAL SETTLEMENT—THE WAGE QUESTION—EASIER MONEY IN LONDON.

The market firmed up on Wednesday on the news of the settlement of the three months' coal strike. The strike resulted in almost complete stagnation in British industry with a consequent lack of demand for money. This led to a further reduction in the bank rate and to a general easing off in the rates asked for loans. The outlook was so threatening, however, that it checked speculation, and the London market, like the local one, has lately been in the doldrums. A better tone, however, is now evident, and the satisfactory Rand dividends, combined with the better outlook in Great Britain generally, are strengthening confidence. Quotations for all gold shares, it will be seen, improved towards the middle of the week, and if, as there is every reason to expect, the mine employees accept the proposed reduction of wages, we may have a good market in specialities, at any rate, in the near future. The debate in the Union Assembly holds out little hope that the Government understands the plight of the poorer mines, and no material relief is to be expected from that quarter. It is to be hoped that the mine employees of the Rand will learn a lesson from the failure of the coal miners' strike, and recognise that they are like the miners in England, "up against" inexorable economic facts. In other sections of the market, oils have been a little more in demand, colliery shares firm, diamonds inactive, and tins quiet. The fusion of the Natal Navigation and Glencoe Collieries has been approved by the shareholders, and the combination is now one of the strongest in the Natal coal industry. The annual review of South African finance and trade by the Chairman of the National Bank is on the whole encouraging and should have a reassuring effect overseas on our credit.

	Fri 24th.	Sat. 25th.	Mon 27th.	Tues. 28th.	Wed. 29th.	Thur. 30th.
Anglo-Amer. Corp.	17 0*	17 6	17 6	17 6	17 9	17 6*
Apex Mines	7 6*	7 6*	7 6*	7 6*	7 6*	7 6*
Bantjes Cons.	4 10*	4 10*	4 10*	4 10*	4 10*	5 0*
Brakpan Mines	—	—	—	—	—	54 6†
Brick and Potteries.	—	4 0*	4 0*	—	—	4 0*
Bushveld Tins	0 7*	0 7*	0 6*	0 6*	0 6*	0 6*
Cassel Coals	—	29 0†	24 0*	—	—	25 0
Cinderella Colls.	1 3*	—	—	—		—
City Deeps	43 0*		43 6*	43 9*	45 9	45 6*
Clydesdale Colls.	27 0*	28 0*	28 0*	—	29 6†	27 6*
Con. Diamonds	11 3*	11 0*	11 0*	11 0*	11 0*	11 0*
Con. Investments		22 0*	22 0*		22 6*	—
Con. Langlaagtes	10 0*	10 0*	10 0*	10 0*	10 0*	11 0
Con. Main Reefs	9 9†	9 3*	9 6*	9 3*	9 3	9 3*
Coronation Colls.	42 6*	—	42 6*	—	42 6*	—
Do. Freeholds	0 9*	0 9*	0 9*	0 10	0 9*	—
Do Syndicates	6 0	6 6*	6 3*	6 9b	6 9*	7 0
Crown Diamonds	2 3*	2 9†	2 6*	2 9	2 9	2 8
Crown Mines	34 0*	—	—		—	—
Crown Mines Debs.	—		36 0†	—	—	—
Daggafontein Maines.	3 4	3 3*	3 6*	3 3*	3 4*	3 3*
E.R. Coals	2 0*	2 3	2 3	2 3*	2 4*	2 4
E.R. Deeps	—	—	0 6*	0 6*	0 6*	—
E. R. Minings	—		—	—	—	7 6*
E.R. Props.	4 9a	4 6*	4 6*	4 6*	4 9b	4 7*
East Rand Debs.	£70*	£70*	£70*	£70*	£70*	£70*
Eastern Golds	—	0 6*	0 6*	0 7*	0 7*	0 6*
Frank Smith Dmds.	2 6*	2 6*	2 7	2 8*	2 8*	2 9
Geduld Props.	48 0*	48 9	48 6*	49 3	50 9	49 6*
Glencoe Colls.	14 3*	14 6	14 3*	14 3*	14 6*	14 6*
Glynn's Lydenburgs.	—	9 0†	9 0†	—	9 0†	9 0†
Govt. Areas	80 0	80 6	80 6*	81 0	81 6	80 6*
Hume Pipes	16 0*		16 0*	—	—	17 0*
Knight Centrals	3 9*	4 0†	3 8*	3 9*	3 10	4 1
Lace Props.	7 0*	7 0*	7 0*	7 0*	7 0*	—
Leeuwpoort Tins	9 6	9 0*	9 6*	9 3*	9 6*	9 3*
Luipaardsvlei Est.	0 9*	—	—	—	—	—
Lydenburg Farms	5 6*	5 6*	5 7*	5 10*	5 10*	5 11
Meyer and Charltons	82 0*	—	80 0*	—	81 0*	—
Middelvlei Est.	1 3*	—	—	1 5*	—	1 0*
Modder B.'s	25 6	25 6	25 6*	25 9*	26 3	26 9
Modder Deeps	43 0*	43 6	43 6*	44 0*	44 6*	44 6
Modder Easts	8 10	9 3*	9 6*	10 0*	10 3	10 0
Natal Navig. Colls	36 9*	37 0	—	36 0*	37 0*	—
National Banks	220 0*	220 0*	220 0*	220 0*	220 0*	—
New Eland Dmds.	—	15 0*	20 0†	—	20 0†	—
New Era Cons.	6 6*	6 6*	6 6*	6 9*	6 6*	6 6*
New Geduld Deeps	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
New Kleinfontein	5 4*	5 3*	5 3*	5 3*	5 6†	—
New Modders	65 6	65 3	65 9	67 0	67 6	67 3
New States	21 6	21 6*	22 0*	22 9*	22 6*	22 6*
New Unifieds	—	—	4 0*	4 0*		4 0*
Nigels	—		4 0*	4 0*		4 0*
Nourse Mines	—	—	7 6*		—	—
Pretoria Cements	50 0*	50 0	50 0*	50 3*	51 0	50 6a
Princess Estates	0 10*	0 11*	0 11*		—	0 11*
Rand Nucleus	1 0*	1 1*	1 0*	1 0*	1 0*	—
Rand Centrals	9 0†	8 3*	8 3*	8 3*	8 9*	8 9*
Randfontein Est.	12 9b	12 9*	13 0*	13 4½	13 6*	13 6*
Roberts Victors	6 9*	6 0*	—	6 3*	—	—
Rooibergs	4 0*		5 0†		—	5 0†
Ryan Nigels		—	3 0*	—	—	—
Rouxvilles	1 0*	1 1*	1 0*	1 0*	1 3*	1 3*
S.A. Lands	4 0*	4 0*	4 2*	4 3	4 1*	4 1*
S.A. Townships	10 0*	10 0*	10 0*	10 0*	10 6*	10 9*
S.A. Alkali	15 6	15 9	15 9	16 0	15 9*	15 9*
Do. Options	3 0*	—			—	—
South Van Ryns	2 6*	—	—	—	—	—
Springs Mines	34 0	35 0	35 0	35 6	35 3*	35 6
Sub-Nigels	11 6*	11 9	11 7½	11 10½	12 0	11 9
Swaziland Tins	10 0		—	—		—
Transvaal Lands	—	16 0*		16 0*	17 0b	16 6*
Trans. G.M. Est.	7 6*	—	7 6*	8 0†	—	8 0†
Transvaal Silvers	24 0	24 0	24 9	25 9	25 9	24 9*
Tweefontein Colls.	19 0†		19 0†	19 0†		—
Union 5 per cent.	£97¾†	£97¾	£98†	£97⅝†	£97¾	£97¾
Van Ryn Deeps	71 6*	72 6	72 0*	72 0*	73 6	74 0†
Village Deeps	7 3*	7 3*	7 3*	7 4*	7 6*	7 6*
West Rand Cons.	—	2 3	2 0*	2 0*	2 0*	2 0*
Western Rand Est.	3 4*	3 4*	3 6*	3 6	3 6*	4 3†
West Springs	9 9*	10 0	10 0†	9 6*	10 0*	10 0*
Witwatersrands	—	12 6*		12 9*	12 9†	—
Wit. Deeps	6 0*	—	6 9*	6 9*	6 9*	6 9*
Wolhuters	3 2*	3 0*	3 3*	3 4*	3 4*	3 4*
Zaaiplaat Tins	3 3	3 0*	3 0*	3 0	3 0*	3 0*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

South-West Diamonds.

The directors of the South-West Diamonds (1920), Ltd., have decided to close down the southern fields of the company in view of the continuing fall in the price of diamonds. They have, however, decided to work on the Nautilus field.

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1920—21.

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The Pretoria Portland Cement Co., Ltd., has declared a dividend of 2s. 6d. per share.

The following certificates were issued by the Mines Department for the period ending June 27th, 1921:—Mine managers (metalliferous mines): J. S. Ahrbeck, W. F. Bulger, K. V. Cunliffe, D. D. Davies, W. R. Hayes, F. W. Jaeger, C. W. B. Jeppe, J. Kable, H. Kahn, J. W. Lawrie, C. H. Luja, A. R. Tyser, W. F. Visser, B. G. Will, F. R. Williamson. Collieries: H. Clarkson, J. C. Ferguson. "Non-fiery" collieries: A. G. Barratt, G. S. T. Brinton, C. E. Donne, L. G. Fox, G. H. Hurtzig, J. W. Lawrie, E. H. Wells. Mine overseers (metalliferous mines): B. Berringer, D. R. Duncan, P. G. P. Kerr, W. D. Kirkman, L. J. van Wyk. Collieries: G. Anderson. "Non-fiery" collieries: W. Williams. Assayers: S. R. Evans, R. Nicholls, A. B. Weekes.

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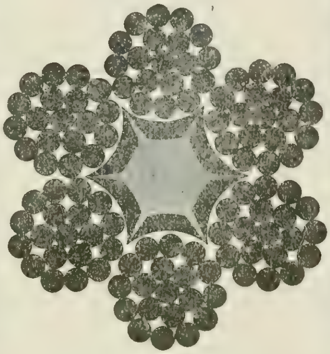

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS DULL BUT OUTLOOK HOPEFUL—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—UNION'S COAL TRADE AND FUTURE—TRADING ON THE MINES—IMPORTATION OF NATIVE LABOUR—BRITISH EXPORTS CREDIT SCHEME—INTERNATIONAL CREDIT SYSTEM—OIL—BRITISH SHIPPING CONDITIONS—WAGE REDUCTIONS—METAL MARKET.

General Position.

The financial year from July 1 starts more promisingly with the ending of the Coal Strike in Britain, after a duration of three months, and with less stringent monetary conditions ruling on the other side, as is shown by last week's reduction of the Bank of England rate of discount to 6 per cent. After recent statements, especially by Mr. Hodges, the Secretary of the Miners' Federation, the collapse of the coal dispute was not unexpected. Let us hope that after the devastating struggle the miners will now settle down to hard work and to maximum production. Locally one thing appears clear, that the various mining groups are slowly but gradually depleting their reserve stocks to such an extent that within measurable time they must come in to the open market for their usual monthly requirements and give merchants the long-looked for opportunity of releasing some of their surplus stocks. The policy of the mines heretofore has been to keep a certain quantity of stores in reserve and not to entrench unduly thereon, but it is thought that this reserve must now be approaching exhaustion, and that we may shortly see some of that activity which previously characterised the beginning of the month by the supplying of the mines' demands. There are already slight signs of improvement as far as outside districts are concerned, especially Rhodesia, but at the moment there are no indications of any immediate improvement in local business conditions. In well-informed circles it is stated that preparations are being made to cope with any little trouble that may occur in local labour quarters, but, on the whole, the feeling of the commercial community is that in the light of recent Home occurrences our miners will take a sober view of conditions and bow to the inevitable.

Iron and Steel.

Inquiries this week were very poor and business generally restricted to very narrow limits. Trading on the Commercial Exchange was negligible. As a rule buying for the Railways is the cause of much activity, but, according to a prominent merchant, buying this week on their behalf has not averaged £100 a day. Latest quotations: Dunswart, 29s.; Union Steel Corporation, Ltd., ordinary sized rounds, flats, and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 49s. 6d.; ⅜ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 49s. 6d. to 62s.; ¼ in. square iron, 55s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. to 62s. 6d; channels and joists, 47s. to 48s.; imported angles, 45s. to 47s.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in., ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 57s. 6d.; ⅝ in., 55s. per 100 lbs.; per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. to 57s.; shovels, 60s.; wheelbarrows, 55s.; picks, 45s. to 75s.; shovels, 60s. to 70s.; wheelbarrows, 70s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d. per 98 lb. coils; 24s. to 25s. per 68 lb. coils, large, 12 gauge, 28s. 6d. per 96 lb. coil; 14 gauge, 22s. 6d. per 66 lb. coil; plain wire, No. 8 galvanised, 35s., and black 32s. 6d. per 100 lb. coil.; fencing standards, 12,

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14, and 16 lb., at 27s. 6d., 30s. and 32s. 6d. respectively per dozen; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb.; steel plates, £32 10s. to £36. Cast steel is £50 per ton; mild steel, £19 per ton

Engineering Shops.

Business is showing gratifying signs of improvement, and there is a feeling that the worst of the slump has been passed. Engineers are now exploring more and more unbeaten tracks in addition to their usual routine work. The stoppage by the Government of various irrigation schemes has been a big blow to some of the engineering importing houses. It would be in the interest of local engineering works, it is said, if these schemes did not go ahead for another five years. Europe is gasping for materials, and although the miners at Home are bound to be beaten, it remains to be seen what the end of the struggle will mean in the future. Miners, like horses, said an engineer, can be brought to the water, but the difficulty is to make them drink—in the case of the miners whether they can be induced to put their shoulder to the wheel and increase their working activity, or whether the end of the coal strike will not mean less—possibly considerably less—work on their part.

Commercial Exchange: Grievance of Small Industrialist.

In an interview with the Secretary of the Commercial Exchange regarding the complaint of a small manufacturer on the functioning of the Exchange, the Secretary very courteously explained the working and aims of the institution. He stated that the strictures passed by the complainant were unfounded. With regard to the statement that organisations such as the Chamber of Mines, Railways, Municipalities, etc., forwarded with their samples to the Chamber specifications and other particulars, he stated that this was the exception rather than the rule, and that such plans could always be inspected at the respective engineering departments, and the municipality plans at the Town Hall. The Secretary further pointed out that the subscription to the Commercial Exchange was the very moderate one of £15 per annum, for which members enjoyed many privileges, such as free telephone, light, firing, newspapers, stationery, etc. It was true that the entry fee was £35, but one could scarcely expect to join an old-established concern like the Exchange, with its many commercial resources and facilities, secured by many years' standing and the payment of subscriptions, for nothing. In his opinion it was a very small concern that could not afford such outlay. In any case, small concerns could, and as a matter of fact did, engage a representative to look after their interests; he knew of some members who represented quite a number of firms, who, of course, were themselves members of the Exchange.

As showing the state to which the British steel industry has been brought by the present coal strike, it is announced that while in September 303 blast furnaces were operating, to-day there is not one. The production of steel ingots in May was 5,000 tons, compared with 800,000 tons in September, 1920

GOVERNMENT EXAMINATIONS

Up-to-date Tuition.

MANAGER'S CERTIFICATE (METALLIFEROUS). We secured **15** Passes from **19** Entries in two recent examinations, and in the last (Jan. 1921) examination secured 7 passes from 8 entries. **Another percentage record !**

MANAGER'S CERTIFICATE (COAL).—New Class recently started. Candidates being enrolled.

MINE SURVEYORS' CERTIFICATES.—We have secured **55** Certificates to date, and lead with passes by more than **10 to 1.**

OVERSEER'S CERTIFICATE.—We lead with passes, 1918 and 1919. **21** Certificates secured during 1920 Overseers' Class (Coal) recently started.

PRELIMINARY SURVEY.—We have trained the majority of the Assistant Surveyors working in the Mines.

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The North-East Coast steel producers, in order to meet the severe foreign competition, have agreed to reduce the prices of boiler plates by £5; ship, bridge and tank plates by £4, ruling at £19; and joists, sections and angles by £3 per ton, ranging from £14.00 to £15.

The Archimedes Steel and Iron Co., of Berlin and Breslau, reports a dividend for 1920 of 35 per cent. as against 15 per cent. in 1919. Its turnover increased from 22,500,000 marks to 93,000,000 marks.

In connection with a big New Zealand development scheme, orders amounting to several millions sterling have been received by British firms from the New Zealand Government. The orders include locomotives, wagons, rails and hydro-electric plant.

Timber and Building Materials.

There is very little activity in these at the moment. Inquiries continue very small. Whether or no cheaper quotations are received from the Baltic, future selling prices are not expected to be below those ruling to-day, which are practically cost or even below. Stocks of timber are now large. 3 x 9 deals are 1s. 3d. to 1s. 4d.; scantlings, 1s. 3d. to 1s. 3½d.; beaver board, 5d.; Oregon, 9s.; pitch pine, 9s. to 9s. 6d.; floorings, 8¼d. to 8½d.; ceilings, 5½d. to 6d.; corrugated iron, 24 gauge, 9½d. to 10d. Furniture timber, Burmah teak, 20s.; American oak, 1 in. to 3 in., 1s. 5d. to 1s. 6d. per super; American black walnut, 1 in. to 4 in., 1s. 6d. to 1s. 7d. per super; West African mahogany, 1 in. upwards, 2s. to 2s. 3d. per super. 3-ply ash, 5 m.m., 10d. per super. Bricks are running from 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; and £5 for pressed per 1,000 at kiln; white lime, 7s.; unslaked, 7s. 6d.; building lime, 4s. 3d.; plaster lime, 5s. 3d.; cement, 11s. 6d. a bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 47s.; 3-ply, 55s. 3d. The building trade is still very inactive.

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Second-hand Iron and Timber Yards.

Business remains very slack; prices are about the same, but the tendency is weaker; iron is ruling at 6d.; timber at 11d. to 1s.; casements, 9s. to 25s.; mouldings from 2½d. Stocks of second-hand material are now very large.

The painters' section of the Industrial Building Workers' Union has refused the proposals of the National Wages Board of the National Federation of Building Trade Employees for a reduction of wages by 6d. per hour and the grading of workmen into three classes.

The proposal of the master builders for a reduction of wages in the building trades is being referred to an aggregate meeting of all building workers to be held here to-morrow (Sunday). The National Control Board of the Building Trade Workers recommends a further reduction of the 44 hours week to a 40 hours week of five days, eliminating Saturday.

Electrical Goods.

Things are exceedingly slow just now everywhere, with very few inquiries. Prices are unaltered, but the tendency is for them to harden in consonance with ruling quotations in Britain. Lower prices are expected to rule at Home now that the coal dispute has been settled, but these cannot be reflected here for some little time. Electrical wares are continuing to arrive steadily from the Continent; a consignment this week showed a decline of 10 per cent. on previous prices and a very large difference as compared with British quotations.

The Union's Coal Trade and its Future.

The Report of the Coal Commission, over which Sir R. N. Kotze presided, has been issued. It states that amongst the mineral products of the Union it comes after gold and diamonds, and with large industrial expansion in Africa it may ultimately become of more value than either. In 1920 the output of coal totalled 11,473,452 tons, two-thirds of which was produced in the Transvaal. It is roughly estimated that the coal resources of the Union amount to 56,200 million tons. Twenty years ago our export and bunker trade only absorbed 359,576 tons; last year the total was 2,897,412 tons. Last year the railways drew £5,201,183 in revenue from the trade, the collieries receiving only £4,506,572 in revenue. Thus the railways obtained more money for carrying coal than the companies received for mining it. The Commission is of opinion that the outlook for an expansion of the trade is good. The East African ports, Aden and Colombo ought to be supplied from the Union, whilst a share of business at Singapore and other Eastern ports and also South America may reasonably be looked for. From the railway point of view it would seem that the Administration is now in a better position to handle a larger export tonnage, with a probable improvement in facilities in the future. The Commission is of opinion that the question of the conservation of high-grade South African coal and the alternative utilisation of lower-grade coal demands serious consideration at an early date. The Commission holds that the question of pooling and grading must be dealt with if the Union's coal is to have the least possible chance, and favours a grading committee of colliery company representatives, with possibly a Government official as chairman. The present pooling arrangement in the Transvaal for export coal finds favour with the Commission. It is held that grading would do away with the spontaneous combustion trouble. The suggestions made by the Commission, if adopted, would doubtless go far to help the industry and its expansion.

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Trading on the Mines.

The report of the Select Committee on trading by mining companies on the mines has been issued. It affirms the principle in the Gold Law that persons carrying on mining should not be directly or indirectly interested in trading with their own employees on their own mining ground. The committee considers that perfect liberty for purchasing should be insisted upon. That should there be any tendency on the part of the mining industry to establish big trading operations on the Rand—a policy which has been disclaimed by the Chamber of Mines and the Industrial Federation on behalf of the mining industry—immediate steps should be taken for its prevention. The committee is in favour of the establishment of co-operative trading societies in close proximity to the mines on the Rand, and that a Bill regulating such trading should be introduced as soon as possible. With regard to stores established by the Native Recruiting Corporation, the committee recommends that they be confined to businesses other than of the native eating-house; that the number of such stores should be limited; and that the nett profits made by the stores should be appropriated for the benefit of the natives. The Committee recommends the establishment of a Native Trading Control Board.

Importation of Native Labour.

The Chamber of Mines quarterly meeting laid stress on the embargo by the Government on the importation of natives from north of latitude 22 degrees south, notwithstanding the recommendations from the Chamber of Mines, the Low Grade Mines Commission and the Unemployment Commission. Prior to 1913 there was no such prohibition, but owing to the high death rate of tropical natives in that year from pneumonia and similar diseases, the Government had stopped that importation. Since that time, however, a vaccine had been discovered which entirely removed this objection. Mr. Buckle said that Ministers who, in the face of the recommendations of the various Commissions, deliberately chose to prevent the importation of native labour, would bear a heavy responsibility when mines had to be shut down and hundreds or thousands of Europeans were thrown out of work.

Exports Credit Scheme.

With a view to aid British traders under this scheme, the Government propose to guarantee drafts drawn against shipments of goods to a maximum of 85 per cent. of the amount of the draft. The new system is expected to come into force immediately, and will be a step in advance of the existing method of advances in ordinary business transactions, as the guaranteed drafts can be discounted in the usual manner. The Government will also participate with British banks and financial houses in the risks incurred in financing trade with the countries included in the scheme, viz., all parts of the British Empire, the British Protectorates, and the mandated territories. For the present it is not proposed to apply it to British India, Ceylon, or the British possessions in the Far East.

International Credit System.

A Conference of international Chambers of Commerce opened in London on Monday last. The president of the American Chamber of Commerce recently stated that the purpose of the conference was to discuss the reconstitution of the world's trade methods and, if possible, to inaugurate an international credit system.

Oil.

The introduction of oil fuel for sea-going vessels is causing much alarm to fisheries round the British Isles, as the fish are contracting congested gills, with the result that death is caused by suffocation. The discharge of oily waste is killing thousands of fish in all quarters from Liverpool to the Thames estuary, from Padstow in Cornwall to Lowestoft. A Bill dealing with the pollution of harbours by oil will shortly be presented to Parliament.

According to latest London advices, oil shares are lower as reductions in prices of oil and its products are feared.

A steamer has arrived at Durban with some 8,000 tons of fuel oil for the Anglo-Persian Company's tank at Island View. The oil bunkering station at this port is now ready to supply oil-burning vessels calling there to bunker.

New York reports that the Mexican oil supply is dwindling. It is stated that in 40 square miles, Mexico's producing area, 63 out of 104 wells have ceased to produce, and that salt water was rapidly filling the others.

Financial.

A notice in the "Gazette" requires every bank in the Union "to establish on or before June 30, and thereafter maintain in the South African Reserve Bank, Pretoria, the reserve balances specified in section 30 of the Currency and Banking Act, 1920."

London reports that the Exchequer returns for the period April 1 to June 11 are: Receipts, £167,500,000; expenditure, £238,250,000; compared with £272,500,000 and £252,000,000 respectively for the corresponding period of last year.

British Shipping Conditions.

Lord Inchcape states that, with the concurrence of the Reparation Commission, nine ex-German ships have been sold to a German buyer at a price which it was impossible to obtain from British buyers. After June 30 it had been decided to throw the market open to the world for the ships left unsold to British buyers. Lord Inchcape further states that the liquid resources of British shipowners appear to be getting exhausted owing to taxation, high wages, strikes, etc.

The Board of Trade states that 1,165 ships of a total net tonnage of 1,707,000 were laid up in the United Kingdom on April 30.

Wage Reductions.

Shipyard workers on the Clyde have accepted a reduction in wages of 6s. 9d. weekly.

The Canadian railways have given notice of a wage reduction of 12 per cent., to take effect as from July 1.

SAFETY FIRST ON THE MINES.

Campaign Against Accidents and Phthisis.

A lecture was delivered on Wednesday night by Mr. A. M. Anderson, ambulance organiser to the Prevention of Accidents Committee of the Rand Mutual Assurance Company, at the New Modderfontein Recreation Club Hall, on the Safety First movement. Mr. H. A. Burrow, underground manager, presided, and there was a small though appreciative audience.

The lecturer briefly outlined the various causes of accidents, and illustrated each by referring to striking cases of negligence which had come to his notice. He strongly emphasised the necessity of knowledge of first aid, and gave instances where lost lives might have been saved had those willing to assist had an elementary knowledge of first aid.

He congratulated the New Modder on the low fatal accident rate of the mine, namely, 1.15 per 1,000 per annum, which compared favourably with the rate for the Witwatersrand gold mines of 2.45 per 1,000 for last year. This figure, although creditable, still left room for improvement, and he urged his audience to co-operate with the Prevention of Accidents Committee and the management of the mine by conveying the message of "safety first" to their fellow-workers, in addition to acting upon it themselves.

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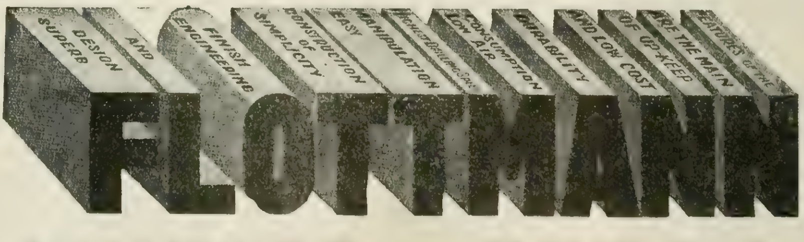

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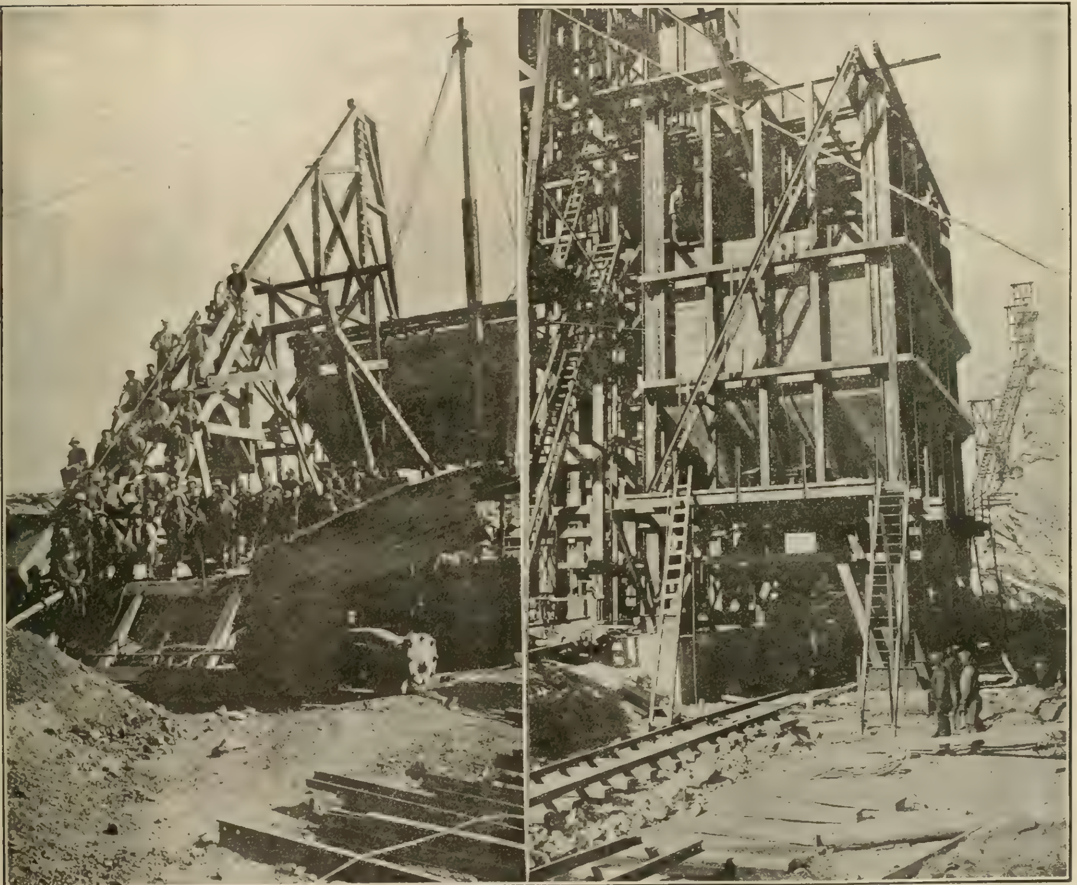
TWO NEW RANDFONTEIN PHOTOS.



The position at the Randfontein Central is improving. The work of re-organisation is now practically completed, and last month's profit was more than double the amount earned in the preceding month. The progress of the Company is dealt with in an article appearing in this issue. The two photos above illustrate (a) on the left the Lindum No. 3 or Southern Shaft, and (b) on the right New Ore Bins at the New Southern Vertical Shaft.

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Randfontein Central.

RE-ORGANISATION PRACTICALLY COMPLETED—RECENT CRUSHING RESULTS—LAST MONTH'S PROFIT MORE THAN DOUBLE THE AMOUNT EARNED IN MAY—THE NEW SOUTH VERTICAL—SOME INTERESTING PHOTOS.

The Randfontein Central Company may be expected to show better results from now onwards, and we give hereunder some account of the re-organisation work now practically completed, together with figures as to recent results of production, and three new and interesting photos, of which two will be found on the Frontispiece accompanying this article. Much interest continues to be taken in the development of the overlying Reefs on the old Randfontein Deep ground, and the borings on the farm "Luipaardsvlei No. 10" are tending to focus additional public attention on this hitherto little appreciated section of the Rand.

The great Randfontein Central proposition has not yet got into its stride, but now that reorganisation is virtually completed one is probably justified in anticipating that better results will be secured from now onwards. And, of course, should the price of gold further advance, or a substantial reduction be effected in operating expenses, a further improvement in profits may be anticipated.

Recent Results.

At the Randfontein Central mill, which is the largest installation under one roof in the world, the quantity of ore crushed during 1920 amounted to 1,560,000 tons, which was 169,400 tons less than the tonnage milled in 1919. This decrease was due to a series of causes, which were fully dealt with in the consulting engineer's report. The working costs per ton were higher than for the previous year, due chiefly to the increased cost of labour, contributions under the Miners' Phthisis Act, gold realisation charges, and to the smaller tonnage dealt with. Consequently the working profit, which amounted to £158,100, was lower by £150,989 than the profit for 1919, when it amounted to £309,089.

Owing to the closing down of certain portions of the mine and to the shortage of native labour, the tonnage crushed during the first five months of 1921 was lower than the average crushed during the previous year. As a consequence of this the working costs show an increase of 1s. 1d. per ton, and this, together with the lower price received for gold, brought the profit for the five months down to £56,748. Last month, however, owing to an advance in the price of gold and a small reduction in working costs, the earning was very much better.

Figures month by month are as under:—

1921.	Tons.	Revenue.	Dwt.	Cost.	Profit.	
January	117,000	£177,989	5·76	27/3	£18,696	3/2
February	100,500	163,830	6·22	31/4	6,236	1/3
March	120,000	188,769	5·99	29/3	13,420	2/3
April	128,500	184,580	5·50	27/2	10,308	1/7
May	121,000	185,141	5·73	28/5	13,102	2/2
June	123,500	201,427	—	27/8	31,322	—

The New No. 3 or Southern Shaft, Lindum Section, Randfontein Central.

The New Shafts.

Sinking in the north vertical shaft was stopped at a depth of 3,896 feet in the early part of last year, but sinking was continued at the south vertical shaft until January of this year, when it was stopped at a depth of 4,712 feet.

The south vertical shaft, being of much greater depth, presented more difficulty in the change over with the existing plant, but owing to the continual caving, cost of maintenance, and delays experienced in the old north sub-incline shaft, it has been decided to hoist the ore from this section through the south vertical shaft in smaller skips pending the completion of the electric hoists. The necessary alterations are now, however, practically completed, and a photo appears on the title page of this issue, illustrating the ore bins at this shaft. Hauling through the old north shaft will now be discontinued, and the ore from the north section hoisted through the new south vertical shaft. By this means it is hoped to increase considerably the quantity of ore sent to the mill from this portion of the property.

The Horsham Lindum Reefs.

It will be recalled that active prospecting operations were commenced on the Horsham and Lindum Reefs, on the Randfontein Deep ground, a year ago, and the results so far obtained are distinctly encouraging.

Two new five compartment incline shafts have been started to develop the reefs outcropping on this property. As a certain quantity of ore will shortly be available from some of the workings at the southern end of the ground, the company are at present connecting these workings with the railway siding in order to transport this ore to the mill.

We give herewith two interesting photos of the new shafts on this section.

The Mining Debate in the House of Assembly.

THE MINISTER REPLIES.

The speeches of the Acting Prime Minister, in his capacity as Minister of Mines and Industries, in the Parliamentary debate of last week, concerned themselves with a reply to the criticisms levelled against the Government's policy, or rather lack of policy, in regard to mining and also to what is known as the Bleloch incident.

Mr. Malan, in the course of his statement, declared that nothing would be done towards the importation of tropical natives without giving the House an opportunity of expressing an opinion on the matter.

With regard to the reorganisation of underground work, he said the arrangements were now complete and would be announced shortly. He paid a tribute to the mines and the Chamber of Mines for the manner in which they had responded to the appeal of the Government to prevent a number of mines from closing simultaneously.

Since the beginning of the year, he next pointed out, no diamonds had been sold, and the companies had been obliged to close. As regards the Mosesberg property, when the preliminary difficulties had been cleared away the proclamation would proceed under the ordinary law.

Very promising indications of oil had been discovered in the Carnarvon district, and he had sent an expert—the best man he had—to investigate the discovery.

Regarding the position of the Pretoria iron industry, he said that the company had done everything, but the difficulty was finance, and as soon as more money had been raised the company would start.

With reference to the cable concerning the Heidelberg properties which was sent to London, the Minister gave the explanation that the cable to London was sent to show that technical officers whose names had been mentioned by Mr. Bleloch did not agree with certain points put forward by Mr. Bleloch.

Dealing with the second phase of the question, the running of certain reefs on certain farms, he said that, however interesting the running of the reefs might be from a geological point of view, that did not interest the practical man who wanted to know where the gold was. There was a difference as to the running of the reefs between Mr. Bleloch and the geological officers, but when Mr. Bleloch had called upon him (the Minister) he had told him (Mr. Bleloch) not to argue on the geological aspect. All he (the Minister) wanted to know was where was the gold?

Replying to interruptions, Mr. Malan remarked that Mr. Bleloch had the capital for the running of the Nigel-Van Ryn, and, as to the reefs referred to, Mr. Bleloch could go on as much as he liked trying to get the public interested, but he must not bring in the names of the technical officers and put forward views supposed to come from them which were not their views. He had received a telegram from Mr. Bleloch asking for an inquiry, but he (the Minister) did not think that any good purpose would be served thereby.

The whole of the Rhodesia Gold Mining and Investment Co.'s shareholding in the Cam and Motor Gold Mining Co. has now been realised at about the present market price.

NATAL COAL OUTPUT RETURNS FOR JUNE.

Colliery.	Coal sold. Tons of 2,000lbs.
Dundee Coal Co.	44,301
Hlobane	39,586
Enyati	35,447
Natal Navigation	28,746
Durban Navigation	23,379
South African	20,655
Northern Natal Navigation Collieries, Ltd.	16,880
Tendega	16,199
Wallsend (Natal)	14,686
Glencoe (Natal)	12,923
Buffalo	10,647
Natal Steam	9,128
Natal Cambrian	8,393
Newcastle	7,683
Ballengeich	6,637
Bernica	6,336
Utrecht	5,643
Elandslaagte	4,367
Tshoba	4,310
Vryheid Coke Co.	1,461
Dewar's Anthracite	1,103
Avon	555
Natal Ammonium	534
New Tendega	—
Burnside Central	—
Parksville	—
Vrede	—
Fairleigh	–
Union Glass	—
Waterval	—
Total	319,599
Corresponding month, 1920	290,528

A Pioneer's Memories of Old Kimberley.

A PEN PICTURE OF THE BEGINNINGS OF THE DIAMOND FIELDS.

(By W. P. Taylor.)

In this article Mr. W. P. Taylor sketches for us the early days of the Kimberley Diamond Fields—now fifty years old—and recalls many of the famous names associated with the diamond industry. He shows how the imagination of Rhodes triumphed over all difficulties and by sheer vision did for Kimberley what Mr. Taylor sees must be done for the Rand if the place is to escape gradual depression and decay.

It was my intention to write again upon the underlying reefs of the great Main Reef Series, but with your permission I will digress. With all my heart I would pour oil upon the troubled waters of heated discussion and, as far as I am concerned, I have no intention of insulting the big houses or Government officials, for amongst the latter I count many friends. But this is not to say that I will not return to the subject, a subject that must be threshed out, a subject fraught with such immense importance that the day will come when sufferers will demand that deep consideration for it that your esteemed journal is to-day so earnestly advocating; but perhaps the comfortable woolly nesters who have sufficient for the day are not to be perturbed, and enjoy reading the excruciations of Europe and listening to the notes of its *danse de cadavre* instead. Therefore, for the moment, let me switch off to the irrevelant. I would tell your readers a tale of the long ago.

The Beginnings of Kimberley.

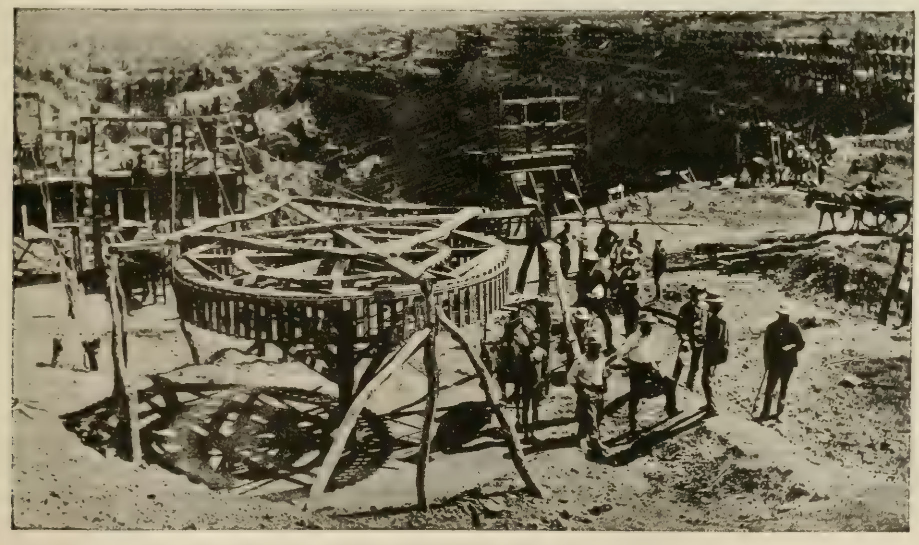
Fifty years ago the Kimberley Mine was discovered. I am not going to tell you how, but I have often wondered why the De Beers Company, that owe so much to its discovery, did not hold an anniversary and invite the old settlers, but I suppose it exhausted its resources with its last dividend, and the drop in diamonds has destroyed all sentiment. However, I'm not fishing for an invitation at this late hour, and what I would have said there I can say now. It is Maeterlinck who tells you, in his "Immortality of the Soul," that man's soul is his memory, and many other great philosophers agree, and it is so. Then let me draw on the shadow of memories.

The Victoria West Flood.

I went to De Beers before the Kimberley Mine was discovered, after having been in the great flood at Victoria West, where 124 people were drowned and where I was half frozen in water which was part hail. There in darkness, in a room with seven feet of water, my employer (Mr. Chas. Smith) and myself were enclosed in a trap of death. With the flashes of lightning we saw human beings and animals carried on a sea of angry waters. When we were released the whole building subsided, and our hearts went out to God for holding its rotten walls until we saw safety. I found my way to Pniel with the late Valerian Litkie, a friend of my lifetime. Pniel was a long, straggling, river diggings. Men worked little squares of claims of alluvial and carted the sifted gravel to the river's edge and there a baby and a cradle—as they called it—reduced it to glistening agates, bantams, rubies, and sometimes a diamond.

Some Pioneer Names.

I remember seeing Sir Joseph Robinson's wagon, which had just arrived from Heilbron. The late Colonel Schermbrucker was the principal auctioneer. Mrs. Jardine had the hotel. There were men from all over South Africa, gangs of Cape boys from farms, and a few Americans. I remember Mr. Julius Berlein's uncle, whom he greatly resembles. There was Diaz's Circus for amusement. Klipdrift, now Barkly West, was on the other side of the river. Stafford Parker, President of the three weeks Republic, with John Coverwell, his off-cast secretary, was on the Pniel side, and at Colesberg Kopje, Klipdrift, was a camp. Its head was Herbert Rhodes, with a gang of Zulus that he had brought from his estate at Umkomaas. His party consisted of Colonel Colin Campbell, Captain Herbert Becher, Captain Paddy Rollestone, Cecil Rhodes, Mr. Gurney, and, I think, J. E. A. Dick-Lander, from Ceylon. There I met Charles Ansell, another lifelong friend. I had already known him from the age of five at the Cape, but I must back to De Beers. I was on shares working with the Grays. Our camp was under a great mimosa. We lived in tents. There



The Kimberley Diamond Mines half a century ago.

was a store; it belonged to one of the Merringtons; his bookkeeper was Mr. Raymond, for many years afterwards in the Transvaal Civil Service. Merrington was found dead, sleeping on his counter. He died in his sleep. It was our first death at De Beers. The Australians, with Thomas Shields afterwards director of De Beers), were the first to sink real shafts at De Beers—narrow long shafts through the floating shales—and they were the first to discover the rich yellow ground under the shale bodies. Then Kimberley was discovered. Jas. Gray had promised my father to peg a claim for him in any important discovery, and the claim was pegged. I could not hold it, as I was only 12 years old. A Welshman named Jones turned up with a camera and a Welsh terrier. Jones persuaded Gray that the claim was outside the reef, and Mrs. Gray took a fancy to the Welsh terrier. Eventually father's claim was bartered for the damned dog, and to my dear old dad's mortification the claim, after placing Jones in affluence, was sold for sixty thousand pounds. It was our first stroke of bad luck. My father and I worked in No. 6 South.

Cecil Rhodes and Others.

Cecil Rhodes, a lad of about 17, sorted quite near by. A big bony lad with his shirt open at the chest, short red hair, and white moleskin pants, and if you had asked me what I thought of him as a youngster I would have said He is very red. I saw Isaac Lewis and Samuel Marks arrive with a wagonette and four horses. They had been on a trading trip, but had brought their goods on to the New Rush, as Kimberley was then called. Amongst the first diamond buyers were Anton Dunkelsbuhler, Yankee Wilson, Simeon Sacke (who is in this town to-day), Henry Barton Webb, C. Posno, Samuel Stonestreet, John X. Merriman, Herbert Becker, Valerian Litkie, Moritz Unger, F. T. Gervers, J. B. Robinson, Julius Wernher, E. F. Gray, John Birbeck, David Harris, and others too numerous to mention. There was the brokers' brigade, of which I became one, and let me say here there never was a more honourable or happier body of men than the old buyers and brokers of Kimberley. Working claims and buying diamonds was my vocation. Kopje walloping over the mines with a pair of scales and fifty pounds in cash, working the grounds like a pointer. I would take a cast, to Bultfontein in a cab, drop the cab, walk to the various sorting tables, buy £5 here and £10 there, exhaust my £50, take a cab to Kimberley, sell for £62 10s., and then take a cart to the west end of Kimberley and most probably buy a glassy stone and make another fiver. I was only 13. I had accumulated £100 and the money worried me, so I bought the two powder monkey boxes off a gun-carriage on a sale and had big padlocks put on them and slept safe. Afterwards, through the kindness of Mr. Sheriff, then manager of the Cape of Good Hope Bank, I was allowed to open an account there, and this continued for many years. Once some 5,000 Zulus at De Beers demonstrated a war dance so threateningly that Commandant Truter, of the Orange Free State, hurriedly and in uniform sobered their intensity.

The Proclamation.

I saw Colonel Gilfillan proclaim Kimberley a British Crown Colony. There was a wagon, and the Mounted Police, with the Colonel at their head, rode up to it and we gathered round. The proclamation was read, then a Union Jack was unfurled, and we all sang God save the Queen. There was a man washing himself—I can see him now—looking up through the soapsuds. Eventually, when he tumbled to it and we sang the National Anthem, he brushed his head vigorously and waved the brushes. No one can imagine how dry that New Rush was. We had to get our water from miles away. It cost 6d. a bucketfull, and we dragged a small cask of it for hours to our tents. The diamond buyer's office was a canvas house. It usually cost £20. There was gravel on the floor, and in the gravel there were fleas. Fleas were everywhere; they bred in the sand, in your sight, and yet our clothes were white. The characteristic Kimberley clothes were white, though later on Cecil Rhodes stuck to brown. He invariably wore a wide-brimmed brown bowler and brown coat and white flannel trousers. At one time two Americans started a gambling hell and a good many young men were ruined. It was soon stopped, and then our early amusement was Dennis Doyle's smoking concerts. I remember Nicholson singing "I'm Racketty Jack, no money I lack, I'm the boy for a spree"; Seymour Dallas, "A fine ould country gintleman, one av the good old kind"; old Mr. Hogarth at the piano; at times R. W. Murray, Senr., would recite Hood ad lib; and so I could go on. All I say is, the early life of Kimberley was simple and fairly pure. Man trusted man and found his trust confirmed. We did not dream of greatness. Rhodes thrust greatness on us, for whilst men were intent, as they are in Johannesburg to-day, on the things they saw, he took up the great unseen, and with the great unknown he thrust greatness on Kimberley and wakened the world, and I trust that his spirit may come to Johannesburg's assistance in the matter of unravelling the puzzle I see before it now.

Royal School of Mines.

At the annual meeting of the Royal School of Mines (Old Students) Association, held at the Institution of Mining and Metallurgy, in London—which was presided over by Prof. S. J. Truscott—a satisfactory report was presented. It stated that, despite the unexpectedly heavy increase in the cost of the publication of the register, there was a balance in hand of over £162. The proposal to form overseas branches of the association had been pressed forward, and appointments had been made in San Francisco, Nigeria, West Africa, South Africa, India, Burmah, Rhodesia and France. The membership was 313. Prof. Truscott stated that in the new building of the Royal School of Mines a tablet would be placed bearing the names of past students who fell in the Great War. The opportunity would also be taken to have conveyed there two tablets associated with the Boer War, which were put up in the Royal College of Science before the new building was erected. Mr. R. C. Griffith was elected president for the ensuing year, the vice-presidents appointed being Messrs. H. Marriott and H. F. K. Picard.—Speaking at the annual dinner of the Royal School of Mines, on the same night, Sir Edgar Walton, High Commissioner for South Africa, said he would like to know whether the school was going to teach its young engineers how to avoid industrial trouble.—Mr. McDermid, secretary of the Institution of Mining and Metallurgy, said it was high time the school had power to grant degrees. Politicians were the same as they were 44 years ago, but they must be "swept aside."

New Transvaal Chemical.

The annual report of the New Transvaal Chemical Co. for the twelve months to June, 1920, shows that the earning capacity of the undertaking is being well maintained. Last year's profit of £78,193, exceeds that for the three preceeding periods, comparing with £72,943 for 1918-19, £70,593 for 1917-18, and £74,136 for 1916-17. For the four years to and including 1918-19, the Ordinary shareholders received a dividend of 20 per cent. This is now to be reduced to 17½ per cent., but the distribution is to be made on a larger capital, and will absorb nearly as much as before, viz., £43,150, as against £43,400. A similar amount—£9,680, as compared with £9,412—is transferred to depreciation account, raising the latter to £33,306, and the sum of £7,874 is carried forward in comparison with £7,141 brought into the account. Sundry creditors are £50,302 up at £196,529, but debtors are £26,763 lower at £153,012. A decline of £124,497 in the amount of stocks and stores on hand and in transit, which now figure at only £25,236, is probably the result in part of altered prices, and it is stated, moreover, that the stocks have again been valued at prices which, as far as can be foreseen, provide against possible loss from depreciation or other causes. Investments are unaltered at £517,232, but the directors have strengthened the liquid position, the cash item being increased from £10,250 to £95,913

Oil in South Africa.

SOME RECENT DEVELOPMENTS—THE CARNARVON AND BETHLEHEM DISCOVERIES—THE ROYAL DUTCH EXTENDS ITS ACTIVITIES—A VALUABLE ERMELO ACQUISITION—WIDELY SCATTERED AREAS—THE OUTLOOK FOR A SOUTH AFRICAN OIL INDUSTRY.

Within the past few months a new industry has been born in South Africa. Potentially, if not actually and presently, the bituminous shales of the Eastern Transvaal and Western Natal constitute a source of supply of crude oil in considerable quantities, and different companies are now engaged in the preliminary prospecting of the oil shale areas which they have acquired.

In addition to these oil shale areas, discoveries of oil in the Carnarvon and Bethlehem districts are announced, and in the following article an attempt is made briefly to take stock of the oil fields of Southern Africa.

Public interest in the development of South Africa's embryonic oil industry has been greatly quickened during the past few days by the reference of the Minister of Mines to the discovery of oil in the Carnarvon district by the interesting paper read by Mr. Hall at the last meeting of the Geological Society on oil in the Bethlehem district of the Orange Free State, and also by the extending activities of the Royal Dutch shell group in this country.

A Working Face in Oil Shale, Wakkerstroom.

This latter Corporation works secretly without any fanfares and does not apparently court publicity in regard to its incursions into South Africa, where it has forestalled possible competition from powerful rivals by acquiring interests in bituminous shale areas in various parts of the country, and particularly in the Wakkerstroom and Ermelo regions of the Transvaal and the Impendhle Valley of the Underberg district of Natal.

A Valuable Ermelo Acquisition.

We understand that the Royal Dutch group's latest acquisition in the Ermelo district is reported to be phenomenally rich in oil content, and the association of the Royal Dutch with this locality has naturally induced other people to acquire interests in this area.

There is evidence of the existence of a very extensive oil shale field in this portion of the Transvaal. Some observers contend that bituminous shales of payable content extend over a great portion of the Eastern Transvaal and that their value is to be reckoned in many millions of pounds.

The Natal Shales.

The shale beds occur again in the Impendhle Valley, Underberg district of Natal, and here too the Royal Dutch has acquired important interests, and well established Natal companies like the Natal Navigation and the S.A. Lubricants have acquired areas.

Royal Dutch v. Standard Oil.

What the fate of these various acquisitions will be remains to be seen. In some quarters the idea is held that the activities of the Royal Dutch Company in acquiring so many areas do not necessarily imply any intention to work them all.

Some weeks ago this journal published an interesting account of the big commercial war between the two most powerful oil groups in the world—the Standard and the Royal Dutch—which is said to be looming on the horizon. Indeed such a combat has already begun, and in some quarters it is held that the Royal Dutch people have extended the scope of their world-wide interests to South Africa and Madagascar in order that their American rivals may not contest any battles of the oil war in South Africa.

What many Men are seeking in South Africa: an Oil Well.

A Promising Outlook.

But the probabilities are that although some discoveries will prove disappointments, payable propositions will be discovered in respect of some of the areas which are now engaging attention and the results secured may easily have a most profound influence on South Africa, which has yet to realise that the first years of the oil age are now upon the world.

Some little indication of the dawn of the oil epoch in Southern Africa is to be found in the fact that Durban is now being equipped as an oil fuel station as well as a coaling port. The recent calamitous coal strike in Great Britain has induced most of the leaders of transportation to think more and more in terms of oil, and the years are not far distant when oil burning and, perhaps, oil engined shipping as well, will make a constant demand on Union ports for liquid fuel.

Widely Scattered Fields.

South Africa's potential oil resources are more extensive and widely scattered than is generally imagined.

It is a far cry from Carnarvon in the Western section of the Cape Colony to the Impendhle Valley of Natal, and oil indications have been noted as far north as in Mozambique and on the east side of Lake Nyasa.

The Bethlehem Discovery.

In his paper read before the Geological Society the other day on the Bethlehem occurrence, Mr. A. L. Hall, Deputy Director of the Geological Survey, made some interesting remarks on other oil occurrences in igneous rocks in this country. He first of all pointed out that recent prospecting operations in the Bethlehem district have located an occurence of crude oil in igneous rocks, which, while apparently falling into line with similar deposits in other parts of the Union, is in some respects unique, and therefore deserves to be recorded. He then proceeded to deal with other and similar discoveries.

Previous Occurrences.

Probably the earliest reference to oil being found in igneous rocks in South Africa is contained in a report by *Galloway* dated 1889. Some dykes of dolerite, which have passed up through coal beds or carbonaceous shales, have become impregnated with the products of distillation, due to the heat given off by them while in liquid condition, and are now found to enclose small quantities of petroleum in the numerous amygdaloidal cavities which they contain. I have examined one instance of this kind at Dordrecht, in which liquid petroleum escapes from the cavities when the rock is freshly fractured; and I have been shown a small piece of the same rock said to have been brought from some locality in the Orange Free State, which emitted a strong odour of the same oil under the same circumstances.

In the annual report of the Geological Commission of the Cape of Good Hope for 1904, *A. L. du Toit* describes several occurrences in the Stormberg series. Thus, on Carrig Bawn, some 20 miles south east of Barkly East, a dolerite dyke, cutting the red beds, carries some tarry oil in crevices and cavities, and the opinion is expressed that if this deposit is due to the distillation of coal or carbonaceous shale, the hydrocarbons must have been brought up from the Molteno beds from a depth of at least 2,000 feet. Along the Kraai River on Bulhoek and Lenham, some 15 miles north-west of Barkly East, bituminous tarry material occurs along joints and in the cavities of a dolerite rock belonging to the Stormberg volcanic series. It is suggested "that there has been a deposition of coaly material along with sandstone and shale in a hollow on the surface of one of the lava flows, and that a later ejection of molten rock covered up the carbonaceous material and distilled off the hydrocarbons." The occurrence of pitch and tar in the agglomerate filling the great volcano at Belmore, about 12 miles east north east of Barkly East, has suggested an alternative view "that the carbonaceous material is foreign and has been brought up from below by an eruption, being derived possibly from the Molteno beds."

In describing the petroleum occurrences in the Orange River Colony *A. R. Sawyer* in 1906 mentions a discovery of petroleum on the farm Nebo, 15 miles north-east of Ficksburg, associated with amygdaloidal volcanic rocks, cave sandstone and the red beds of the Stormberg series. These are traversed by dykes and sheets of dolerite, and it is interesting to note that the relationship of the former to the cave sandstone, as shown in the figures illustrating Sawyer's paper, are very similar to those seen south of Bethlehem. The main dyke on Nebo is from 20 to 30 feet thick and gives indications of petroleum along its joints; it "clearly shows evidence of having been impregnated in the joints, with the products of distillation, arising, probably, from the destruction or alteration of coal or bituminous shale, due to the heat given off by it, while in a liquid condition. This phenomenon is, therefore, evidence of the occurrence of petroleum at or about the lines of contact of a dyke and a carbonaceous bed." Similar occurrences are stated to exist in the Heilbron district.

C. G. S. Sandberg in dealing with the general oil prospects of South Africa, refers to dykes and sheets being richly impregnated with oil as, for example, in the Harrismith district (Temworth farm), the Bethlehem district, and elsewhere. Sandberg concludes that the oil so found is "simply a product of the dry distillation of coal beds and bituminous shales traversed, in their upward course, by these igneous rocks while still in a molten condition."

At the Natal meeting of the South African Association for the Advancement of Science in 1907, the *Rev. J. Fitz-Henry* discusses indications of petroleum at the base of the "Platberg" near Harrismith in the crevices and cleavage lines of a dolerite dyke on the Wilge River at an elevation of some 5,200 feet above sea level. In discussing this paper, *C. J. Gray* expresses the opinion that this indication may be due to the intrusion of igneous rocks through oil shale beds causing partial distillation of oil.

In 1908 appeared a short paper by *G. J. Kellner* dealing with petroleum in the Orange River Colony, in which reference is made to bore-hole operations on Nebo (Ficksburg district), at Clocolan, and in the neighbourhood of Bloemfontein, and it is suggested that vertical impervious dykes have cut up the oil region into detached basins.

Summarising the South African oil occurrences in 1909, *H. Hofer* refers to a discovery of oil between Boshof and Kimberley, also in the neighbourhood of Ladybrand and Ficksburg. Reference is here also made to basaltic dykes carrying tarry bituminous matter as a secondary deposit in the Harrismith and Bethlehem districts.

Situation and Geology.

Situation. The farm Madrid, No. 281, lies about 30 miles south-east of Bethlehem on the south side of the Little Caledon River and some four miles from the Free State-Basutoland border, in highly mountainous, deeply dissected country, at an average of roughly 6,400 feet above sea level.

The present portion of the Bethlehem district belongs to the strip of bare country running along both sides of the Basutoland border, over which the uppermost or Stormberg series of the Karroo system, including a great thickness of volcanic rocks, has been sculptured into a series of mountain ranges, precipitous krantzes, deep kloofs and ravines, the general aspect being highly characteristic of the land forms produced by erosion operating on a great succession of horizontally bedded strata.

Geology. All the formations met with belong to the Stormberg series, and comprise the following in descending order:—

Basalts, amygdaloidal basalts and allied rocks: volcanic group (Stormberg series).

Massive sandstone: cave sandstone (Stormberg series).

Soft pruplish shaley sandstones: red beds.

Thin vertical basic dykes, younger than the volcanic group.

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1. W. Galloway.—"Report upon the Coal Deposits in the Indwe Basin and Stormberg Range of Mountains." Capetown, 1889. Cape G.H. Parl. Rep. (G.50—'89), p. 9.
2. A. L. Du Toit.—Ann. Rep. Geol. Comm. C.G.H., for 1904, pp. 101 and 128.
3. A. R. Sawyer.—"Petroleum Occurrences in the Orange River Colony." Trans. Inst. Min. Eng., London, 1906.
4. C. G. S. Sandberg.—"The Oil Prospects of Central British S.A." Trans. Inst. Min. Eng. London, 1908.
5. Rep. S.A.A.A.Sc. Fifth Meeting, Natal, 1907. Capetown and Johannesburg, 1908, pp. 76-77.
6. G. J. Kellner.—Petroleum in der Orange River Colony (S.A.), Z. prakt. Geol., 16, 1908, pp. 283-284.
7. Engler Hofer.—Das. Erdol, Leipzig, 1909, vol. II., pp. 573-575.

In this succession the oil bearing rocks form a stratum of amygdaloidal basalt resting directly upon the cave sandstone and from 20 to 40 feet thick.

The strata are nearly horizontal, with probably a slight dip of one or two degrees towards the south. The succession is remarkably regular and undisturbed, the junctions between the various formations almost coinciding with the contour lines. Only one instance of faulting was observed—on the farm De Rets, where the throw amounts to some 10 feet vertical.

Mr. Hall's conclusions were summarised in our last week's issue.

The Carnarvon Discovery.

The Government Geologist, Dr. Wagner, has made an investigation at a borehole some sixty miles from Carnarvon, where recently there have been hopes of finding oil. On Tuesday a depth of over 600 feet was reached. In a geological sense alone the borehole is of enormous value, proving as it does the secrets lying under the Karroo and so indicating broadly the formation of a large tract of South Africa. Hitherto it has shown large masses of granite of dolerite with some oily looking sand and eventually a hard belt of dolerite, garnets, etc. The borehole is situated in the middle of a great almost circular pan of salt veld stretching for many miles. Around are typical South African flat-topped hills and longer ranges, with here and there almost perfect isolated cone-shaped peaks. In the desolate region the iron-tripod structure nearly a hundred feet high over the borehole is an unfailing landmark, while the second most powerful drill in the country, with its attendant boilers and appliances, is a striking contrast to the wildness of nature around.

Necessary Specimens Secured.

Dr. Wagner has secured all the necessary specimens for analysis, and naturally until this is made and his report sent to the Government, nothing definite can be said as to indications of an oil belt in this part of the country. Dr Wagner watched the drill at work, and highly praised the skill and efficiency of the mechanical staff. While the drill was revolving small quantities of gas came bubbling from the water running from the boreholes, and when lit the gas burned with a yellow flame. Specimens of the substance coming from the boreholes were taken for analysis. The district from Hutchinson to Calvinia is excited over the work in the borehole, and Dr. Wagner's report is eagerly awaited.

Griqualand West Shale.

We learn too that an extremely valuable deposit of oil shales has been made in Griqualand West, which has nothing to do with anything previously reported. The assays are stated to give 12 gallons of petrol and 40 gallons of strong ammonia, and the area proved by boreholes at 90 to 100 feet is from 40 to 50 acres. This is only a small portion of the area on which the deposit occurs. The shale (all in the Ecca Shale formation) is 8 feet thick.

Further information regarding the Carnarvon and Griqualand West discoveries is eagerly awaited. Whilst it would at this juncture be unwise to make predictions of too optimistic a nature as to the likelihood of developing a large oil industry in the country, it can at least be said that, taking the present encouraging data in regard to bituminous shales in conjunction with the prospects of other recent discoveries, such as those made in the Carnarvon and Bethlehem districts, there is a fair warranty for believing that the Union will in the not far distant future supply from her own resources no small amount of the country's oil requirements.

The Johannesburg Municipality has accepted the tender of the Transvaal Coal Owners' Association, Ltd., for the supply during twelve months from 1st July, 1921, of 6,000 tons per month (more or less) steam nut coal, at 12s. 4d. per 2,000 lbs. Should the Association be unable to supply the full requirements of the Council in nut coal, any shortage to be made up with pea coal, at 11s. 4d. per 2,000 lbs. The total approximate value of this contract is £14,100.

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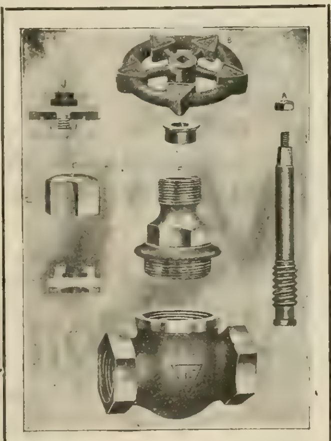

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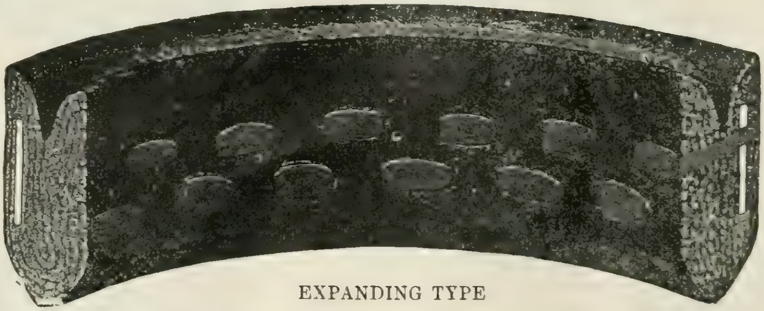

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The Oil Shale Occurrences in Maviriestad, Ermelo.

ENCOURAGING REPORTS BY MESSRS. MILLS, DAVIES AND MACLATCHY—HIGH OIL CONTENT.

What promises to turn out an unusually valuable oil shale discovery has been made on the farm Maviriestad, in the Ermelo District. It has been reported separately upon by Mr. J. E. Mills Davies and Mr. A. G. Maclatchy, and both these engineers are in substantial agreement regarding the potential value of the find. *Inter alia*, Mr. Mills Davies writes:—

The farm Maviriestad is situated upon the line of railway between Breyten, Ermelo and Vryheid, at a distance of about 20 miles south east of Ermelo.

The area of the farm is approximately 3,427 morgen or 7,265 English acres. It is abundantly watered by perennial streams.

Geological Conditions.

The farm Maviriestad lies within an area that is occupied by strata belonging to what is known to South African Geologists as the Middle Ecca Series. The series is that in which the coal measures of the Transvaal and Natal are located, and the beds which compose it consist of sandstones, grits, shales and coal seams. One coal seam appears to have been worked, in a small way only, for local requirements. I believe it to represent one of several that are found to extend over the whole of this district, through the Wakkerstroom area, and into the North Eastern part of Natal. These coal seams are those which are worked, at one horizon or another, in the principal coal mines of Natal.

Oil Shale.

At about 120 feet below the coal seam just referred to, there is found upon Maviriestad a seam of oil-producing shale with a thickness, as shown in three cuttings near to each other on the South Western side of the farm, of from three to five feet. In another cutting, towards the North Eastern side, it has been found to extend over a width of six and a half feet.

The shale is of a compact kind with a silky texture. It appears to consist of bands which vary somewhat in appearance and probably in value over the section of the seam. In some places it has the appearance, fracture and general physical qualities of cannle coal. Broadly speaking, I think the seam can be divided roughly into an upper and a lower section, of approximately equal thickness, of which the upper section is higher in value. As comparatively little work has been done upon the property, I was unable to arrive at any very definite conclusions upon the point.

An analysis of the shale that was recently made by Mr. R. H. Rundle gave an average result of over 20 gallons of crude oil per short ton of shale. I consider this a very satisfactory yield. Over a width of shale such as that exposed on Maviriestad it should give a handsome profit in excess of all producing and marketing expenses.

The shale has been used, I understand, for fuel purposes by people living in the neighbourhood of the property.

Area of Oil Shale.

As far as I could judge from a cursory examination of the geological features and physical contours of the farm, I conclude that the oil shale seam just described covers the whole area of the farm with the exception of the strip of say, 100 yards wide, along the course of the main spruit. This estimate means that there are about seven thousand acres, roughly, that are recovered by this seam. It will be necessary to confirm this figure later on, by means of a survey.

On the usual basis of 200 short tons per inch per acre over a width of 6 feet, there would be 100,800,000 short tons of shale over an area of 7,000 acres.

Working Facilities.

Since the shale seam crops out at the surface, or lies at only a shallow depth beneath it, with a low dip towards the outcrop, it would be possible to work the greatest portion of it from adits, which would admit the natural drainage and the cheapest kind of underground transport. Actual breaking costs, therefore, would be very low, not exceeding say 2s. a ton mined. This does not include tramming and overhead charges. There are no data to go upon informing our estimate of expenditure in the mining and treatment of oil shale in South Africa, but a figure of 3s. per gallon of crude oil and 25s. per ton of shale to cover all working and overhead costs and interest charges has been taken, as more than ample for preliminary purposes.

A shale going 20 gallons of crude oil per ton, for instance, would be worth about 60s. per ton, which, at a cost of 25s. for mining, retorting and refining, would leave a profit of 35s. per ton of shale.

It is too early to enter upon a consideration of questions of this kind at this stage, however. The figures quoted are merely given with the object of showing that if 20 gallons represent the average value of your oil shale you have, over the working width which appears to prevail upon the property, a proposition that deserves your very best attention.

Transport Facilities.

The existence of a line of railway upon Maviriestad is a facility which is obviously of the greatest value. The railway runs directly to Natal on one side, and is connected with the main Transvaal system at a point of considerable economic importance.

Inter alia, Mr. Maclatchy writes:—

In accordance with your desire, I visited the farm Maviriestad No. 116, Ermelo District, on the 7th inst., for the purpose of inspecting and reporting upon the oil shale deposits found there. Mr. Frankfurth accompanied me, and Mr. Steenkamp conducted us over the property. It is situated about 23 miles South East from Ermelo, on the Ermelo-Piet Retief-Natal railway line, which traverses a portion of the farm. There is a siding named Maviriestad on that portion, Sheepmoor Railway Station being only a few miles farther on, and in close proximity to the farm. The situation is, therefore, a highly favourable one as regards accessibility and railway connection. Oil shale appears on the surface, cropping out amongst the krantzs towards the southern boundary, at three separate points, which provides

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sufficient evidence of its existence, although no extensive exploratory work has yet been done in that locality. The thickness there runs from 4ft. to 4ft. 6in. From that point there is a spruit running down into the heart of the property, and at a distance of probably two to three miles from the outcrops mentioned, an opening has recently been made in the bank of the spruit, and a thick deposit of oil shale exposed, the section being:—

Sample No. 1.—Shaly Canal Coal	2ft.	8in.
Sample No. 2.—Good Oil Shale...	2ft.	8in.
Sample No. 3.—Rough Oil Shale	1ft.	2in.
	6ft.	6in.

The whole forms one body 6 ft. 6 in. in thickness, with no intervening bands of waste matter. This is the most important discovery yet made, and it leads one to form the opinion that probably most of the property carries oil shale of good quality. It is, of course, quite impossible to be definite upon that point, at the present stage, but it is more than sufficiently promising to warrant systematically proving the ground by means of boreholes, shafts and adits, after which reliable estimates can be formed.

Samples taken from the opening mentioned above have been submitted to analysis, with the following results:—

Sample No. 1 yielded 12 gallons of crude oil per ton.

Sample No. 2 yielded 28 gallons of crude oil per ton.

Sample No. 3 yielded 12 gallons of crude oil per ton

With such highly encouraging and satisfactory results from a preliminary sampling, the property can only be regarded as a very valuable one. So far, there is evidence of only one dkye on the farm, and as that is close to the boundary, it is of no great importance, as it can affect only a very limited portion of the whole. It is possible that other dykes may be discovered, which are not visible on the surface, but as yet none are recorded. The total area of the farm is 3,427 morgen. Now if we take the actual figures of thickness and value disclosed, and assume that there is an area of 6,000 acres of exploitable ground available, there would be:—

(a) 38,400,000 tons of shale, yielding 18 galls. of crude oil per ton.

(b) 38,400,000 tons of shale, yielding 28 galls. of crude oil per ton.

(c) 16,800,000 tons of shale, yielding 27 galls. of crude oil per ton.

93,600,000 total tons.

Estimating the crude oil contents at the conservative value of 3s. per gallon—

(a) would carry a total value of ...	£103,680,000
(b) would carry a total value of ...	161,280,000
(c) would carry a total value of ...	30,240,000
Or a grand total of	£295,200,000

Taking the cost of mining and distilling at 20s. per ton, which, I think, may be regarded as an exaggerated figure, and putting the average value of (a), (b) and (c) together, at the round figure of 60s. per ton, the profit would amount to 40s. per ton of shale mined and treated. It should also be borne in mind that there may be further workable oil shale seams underlying those already open to view, which would still further enhance the value of the property. The seams appear to lie with very little dip and rise, and are close to the surface, rendering mining easy and cheap, proabably not exceeding 4s. per ton. Those tremendous figures serve to convey an idea of the range of possibility should there be 6,000 acres carrying a deposit of similar thickness and value to that opened up on the bank of the spruit, so it is evident that even if only one-quarter of the farm should prove to be all right, you would still have an extraordinarily fine proposition. Meantime it is impossible to be otherwise than deeply impressed with the possibilities of the property, which appear to be very great indeed, in fact at this stage I know of no other to compare with it. Proximity to the railway line, thickness and value of the seams so far as already ascertained, and low mining cost, all go to rendering it a most attractive proposition, and I have no hesitation in advising you to go to the expense of exploring it thoroughly, thus securing definite data to work upon. I was informed that there is also an outcrop of coal on the farm. This also may be worth investigation along with the oil shales.

Selukwe.

The report of the Selukwe Gold Mining and Finance Company for the year ended 31st March, 1921, states that the Board is informed that towards the end of the current year the Premier mine will begin to make returns calculated to attract attention to its undoubted potentialities. If these expectations are realised, the half-interest held in the B. C. Silver Mines should greatly increase in value. The income from dividends, interest, etc., amounted to £2,223. After taking into account Rhodesian and London expenses and debit brought forward, profit and loss at 31st March, 1921, shows credit balance of £9.

ENGINEER, Mechanical, M.I.Mech.E. (37), single, now in England, seeks post in South Africa. Fully qualified; extensive railway experience as Chief Mechanical Engineer in the East. Would join firm of general engineers.—Address N. G., c/o "Mining Journal," Box 963, Johannesburg.

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DECLARATION OF DIVIDEND No. 25.

NOTICE IS HEREBY GIVEN that under Article 119 of the Company's Articles of Association, an Interim Dividend of 5 per centum, equal to One Shilling per share, free of Union Dividend Tax, in respect of the period ended 30th June, 1921, will be payable to Shareholders registered in the Books of the Company at the close of business **on the 30th day of July, 1921,** and to holders of Coupon No. 25 attached to Share Warrants to Bearer.

The Transfer Books of the Company will be closed from the 31st day of July to the 7th day of August, 1921, both days inclusive.

Dividend Warrants will be issued to European Shareholders from the London Office, Palmerston House, Old Broad Street, London, E.C. 2, and to South African Shareholders from the Head Office, Johannesburg, as soon as possible after the receipt of the final London Transfer Returns.

Coupon No. 25 attached to Share Warrants to Bearer must be presented on or after the 7th September, 1921, at either of the undermentioned offices:—

Head Office of the Company, 87-94, Exploration Buildings, Johannesburg:
London Office, Palmerston House, Old Broad Street, London, E.C. 2.
Coupons must be left four clear days for examination

By Order of the Board of Directors.

J. CHARLESTON GOCH & CO.,
Secretaries.

Head Offices, 2nd Floor, 87-94, Exploration Buildings.
P.O. Box 4122, Johannesburg, 7th July, 1921

Oil and the Recent Coal Strike.

SOME LESSONS DRAWN FROM EXPERIENCES IN GREAT BRITAIN.

The recent strike in the British coal industry—now happily ended—led, according to the cables, to a great boom in oil. We now learn from the mail papers that fortunately when the strike broke out there were abundant supplies of liquid fuel available in the country, and one of the surprises of the struggle was the remarkable ability of the railways, municipalities and manufacturers to adapt their machinery to the use of oil. Now that the strike is at an end, however, it is generally agreed that the future use of oil has to be governed by general economic conditions. The British Navy, we know, has decided to build no more coal burning ships, and the British Government has gone out of its way to secure a controlling interest in the Anglo-Persian Oil Co., which is generally regarded as an excellent stroke of business. We must guard against the danger, however, of assuming that the world is full of oil and that coal is, to use a collogialism, "finished." Evidence such as that from the Mexican fields goes to show how careful we must be with such assumptions. In a review of the existing position which appeared in the *Colliery Guardian* some months ago (July 2, 1920, p. 37) attention was called to the enormous growth in oil consumption in excess of the visible supply. It may not be amiss to repeat a declaration by Dr. Otis Smith, director of the U.S. Geological Survey, to the effect that "any nation which to-day aspires to a large part in world commerce imposes upon itself an oil problem, for the future freedom of both the sea and the air will be defined in terms of oil supply"; "yet," he added, "not a barrel of oil should be burned where coal is available and will serve the same purpose."

In last month's *Contemporary Review* Prof. Gregory adds his warning. He says "the spirit which led me, in 1907 and 1919, to side with the optimists in discussions as to the future of iron and coal, now makes me cautious regarding ill-forebodings as to the prospects of oil. The supply of oil, however, is by no means so assured as that of coal and iron, and the temptations to its reckless use are difficult to resist." His considered opinion is that irreplaceable mineral oil should not be cast under the boilers of tramp steamers, or petrol used for purposes for which a refuse-burning Diesel engine is available. The quantity, he says, is obviously inadequate for oil to serve as the world's primary fuel. In 1918 the total output of oil was about 70 million metric tons—equivalent to from 90 to 100 million tons of coal—whereas the world's total coal output in 1913 was 1,477 million tons. Moreover, there are only too good grounds for the apprehension that the oil supply is far more limited than that of coal.

The American Petroleum Institute has just published statistics showing that in 1920 a total of 44,487,319 barrels of fuel oil were delivered for ships' bunkers, as compared with 27,102,616 barrels in 1919, an increase of 64.1 per cent.

In a recent issue the *Colliery Guardian* also makes a good point by stating an important factor in the case arises from the varied uses of oil—uses for which coal is no practical substitute. The same source from which is obtained the motive power for motor vehicles and aeroplanes, also supplies the lubricants which ensure their operation. "There may be a future in the distillation of shale," adds our contemporary, "and the preparation of oils from coal tar—indeed experiments are being continually prosecuted in Canada, the United States, and even in England in this direction—but the field of supply bears about the same relation to the supply of liquid petroleum as does the latter to that of coal."

We offer no apology for quoting these authoritative statements. They may be more or less familiar to students of the subject; but the recent oil *versus* coal discussions in the general press has made them worth repeating.

A Banker's Advice.

It is noteworthy that Sir Felix Schuster, chairman of one of the largest British banks and a recognised leading authority on finance, has come out boldly with the statement that trade and finance cannot get back to a sound basis till the countries that have suspended it return to the gold standard. Even from the brief cabled summary of his speech there is no misunderstanding his meaning, which is on the lines that Mr. Samuel Evans has been preaching for some time back. Of course the practical difficulties in the way of a return to the gold standard are still enormous, but it is well that it should not be lost sight of as the ideal which countries like South Africa must continue to aim at.

The New Germany.

The London correspondent of the *Birmingham Post* writes as follows, under the title, "A Mammoth German Trust":—I find myself rightly taken to task for not having been more explicit the other day when saying, touching a reascent up the sides of the pit in which Germany now lies, that Germans were facing the facts of their poverty squarely, and were thinking out new forms of industrial and social organisation. What I had in mind was Herr Walther Rathenau's scheme for the co-ordination of all German industries and commerce in one "kartel" or trust, operating under a charter granted by the State. It is an integral part of his plan that there shall be a systematic and continuous application of science to industry, with the object of getting cheaper and better production all along the line. The idea may be good or bad; there must be something in it, for Herr Walther Rathenau is at the head of the Allgemeine Electrizitats-Gesellschaft, and before the war was one of the greatest of German industrialists. He is no theorist. I have not seen the pamphlet in which the plan is set forth, and it is not yet obtainable in English. I write from recollection of a summary, and have got hold only of the central idea. Whether it is an impracticable idea or not is not relevant to the point that Germans are doing some very hard thinking. I had also in my mind Herr Rathenau's "The New Society," which faces the facts of post war German life with a candour which is almost terrible, and yet opens out a path of recovery—a very flinty and toilsome path indeed, for the author is no idealist, but the sternest realist. I make these points purely to illustrate the sort of work German brains are now doing under the stimulus of defeat and poverty. They may be down and under now, but they will be a formidable people to be in competition with in a decade or two."

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The Half Years' Dividends.

GOLD MINES' TOTAL OF 3¼ MILLIONS—FAR EAST RAND CONTRIBUTIONS MAINTAINED—SOME MISCELLANEOUS DECLARATIONS.

The following tables show the dividends declared by Rand and Outside gold mining companies for the half-year ended 30th June, 1921 (a list of miscellaneous dividends is also included), together with the notification for the corresponding period of last year:—

	Date, 1921.	Rate per cent.	Capital.	Amount.	First half 1920. Rate per cent.
Brakpan Mines	June	15	£850,000	£127,500	15
City Deep . . .	June	20	1,295,000	259,000	12½
Cons. Langlaagte	June	5	950,000	47,500	5
Cons. Main R'f	June	3¾	1,247,602	46,785	6¼
Crown Mines .	June	10	940,106	94,011	27½
Ferreira Deep .	Mar.	7½	980,000	73,500	10
Gov't Areas . .	June	25	1,400,000	350,000	20
Geduld Prop. .	June	7½	1,173,687	88,026	7½
Langlaagte Est.	June	5	886,500	44,325	2½
Meyer & Charl.	June	50	200,000	100,000	50
Modder B . . .	June	40	700,000	280,000	32½
Modder Deep .	June	65	500,000	325,000	60
New Modder . .	June	42½	1,400,000	595,000	45
New Primrose .	June	5	325,000	16,250	—
New Unified . .	June	5	250,000	12,500	5
Nourse Mines	June	2½	827,821	20,695	3¾
Robinson	June	1	2,750,000	27,500	—
Rose Deep . . .	June	7½	700,000	52,500	10
Springs Mines .	June	7½	1,307,236	98,043	5
Van Ryn Est. .	June	7½	500,000	37,500	7½
Van Ryn Deep	June	30	1,196,892	359,068	25
Village Deep .	June	3¾	1,060,671	39,775	2½
Witwatersrand.	June	10	469,625	46,962	5
Wit. Deep .	Feb.	5	550,000	27,500	—
Do.	June	5	550,000	27,500	—
Wolhuter	April	3¾	860,000	32,250	6¼
Glynn's Lyd'g.	Jan.	5	170,000	8,500	7½
Sub-Nigel . . .	June	3¾	775,000	29,063	5
		Total		£3,266,253	

Miscellaneous.

	Rate per cent.	Amount.
Anglo-American Group—		
Anglo-American	5	£159,542
Rand Selection	15	90,000
Anglo-French Group—		
Apex Coal	5	7,500
Central Mining Rand Mines Group—		
Central Mining	6	127,500
Swazi Tin	7½	6,150
Rand Mines	35	186,024
Pretoria Portland Cement	12½	78,750
Witbank Collieries	17½	61,250
Johannesburg Cons. Invest. Group—		
"J.C.I."	10	395,000
Union Corporation Group—		
Union Corporation	16	140,000
DIAMONDS.		
De Beers (Def.)	10/-	£500,000
De Beers (Pref.)	10/-	400,000
Premier Diamonds (Pref.) per share ...	6/3	46,250

Where the Dividends come from: a Typical Rand Gold Mine.

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Clydesdale	10	£18,500
Natal Navigation ... ...'	5	20,950
Do. (bonus)	5	20,950
Transvaal and Delagoa Bay	5	27,750
Enyati	10	20,000
Buffalo	20	20,000

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Reef Controversies

MR. BLELOCH AND DR. ROGERS—GEOLOGICAL SOCIETY'S MEETING.

At the meeting of the Geological Society held last week Mr. Bleloch made a first contribution to the discussion on Dr. Rogers' paper on the "Geology of the Neighbourhood of Heidelberg."

Mr. Bleloch first remarked that the paper was on a subject of the greatest moment to the Rand and to all South Africa, because on the correct solution of the problems it dealt with depended nothing less than the well-being of this industrial community and the future financial stability of the State. He could not understand, therefore, why Dr. Rogers—the Director of the Geological Survey of the Union—had actually apologised for bringing these questions before the Society. He earnestly asked the members of the Society not to adopt such an attitude, but to consider the questions raised as matters of the most serious moment and to discuss them free from bias or prejudice.

Mr. Bleloch then went on to say that he had come to put, with permission of the Chairman, one or two questions to Dr. Rogers on certain fundamental questions in Rand geology, which formed the main points of divergence between the views of Dr. Mellor, Dr. Rogers, and others of their school, and the views of the school with which he agreed. It was necessary to have definite pronouncements from Dr. Rogers on these points before his paper could be properly discussed. The first of these fundamental questions was that of the Langermann's Kop beds at Kensington. As many members of the Society would know, Langermann's Kop is a large hill range running eastwards through Kensington into the Bezuidenhout Valley, about 1¼ miles north of the Main Reef Outcrop line on the Central Rand. The Kop consists of a wide series of quartzites containing numerous large pebble Banket Reefs, the whole formation lying on wide beds of shale which crop out at the foot of the kop along its northern side. Further eastwards along the Bezuidenhout Valley there is another outcrop of what looks like the same large pebble bankets as those of the kop in a position where Dr. Hatch and Dr. Costorphine erroneously marked the occurrence of the Rippled Marked Quartzite of the Yeoville series in a geological plan of the valley, which accompanied a paper by them read before the Society some 15 years ago. There are no ripple marked beds there, he said. Then still further on at the eastern end of the valley there is the Reitfontein Mine, which worked the Reitfontein Reef Series, and to the south of that line of payable gold-bearing reefs there are again large pebble banket beds like those of Langermann's Kop—the beds he called the South Reitfontein or Langermann's Kop Series, and which he identified with the Battery Reefs of Krugersdorp and the so-called Kimberley Reef of the Far East Rand. The view of the school which Dr. Rogers seemed to follow was that the Langermann's Kop Bankets were Elsburg Reefs faulted down. He would like to ask Dr. Rogers if he agreed with that view? Dr. Rogers appeared to indicate that he agreed, although his reply was indefinite. Mr. Bleloch then said that Dr. Mellor seemed also to be not quite decided on this very important question in Rand geology, but he said Dr. Mellor had made a definite pronouncement on the Reefs of the Reitfontein Mine, viz., that they were a faulted portion of Main Reef Series of the Central Rand. He would ask Dr. Rogers if he was in agreement with Dr. Mellor in this. Dr. Rogers first said he had not been down the Reitfontein Mine. Mr. Bleloch pointed out that there was a wide and lengthy exposure of the whole formation there, and it was not necessary to go down the mine to form an opinion. He did not mind what Dr. Rogers' answer might be, but he would like an answer even if it was to the effect that Dr. Rogers did not know. Dr. Rogers then said he was in agreement with Dr. Mellor that the Reitfontein Reefs were Main Reef Series. "And the South Reitfontein Reefs, what are they; are they Elsburg Reefs faulted down, like at Langermann's Kop?" asked Mr. Bleloch. Dr. Rogers replied that he had not examined these reefs and he could not answer. "Of course, if Dr. Rogers has not examined the beds, I can quite understand that he does not know how to answer," was Mr. Bleloch's remark, and he went on to say that the view of his school was that the Langermann's Kop—Reitfontein beds were neither Main Reef nor Elsburg, but were the beds of the Far East Rand and the Far West Rand, that is the beds of Randfontein and Krugersdorp and the beds of the Far East Rand and the Heidelberg District, and that they contained near their base the great gold-bearing reefs known as the Van Ryn Reef on the east and the Botha Reefs and Randfontein Reefs on the West. In the reefs near the foot of Langermann's Kop you could get assays of over an ounce to the ton, and no reefs like these and no shale beds like those underlying these reefs were to be found in the Elsburg Series.

The Ventersdorp Beds.

And the second fundamental question on which there was definite divergence of view was that of the conformability or unconformability of the Ventersdorp beds with the Witwatersrand System. Dr. Rogers had said in his paper

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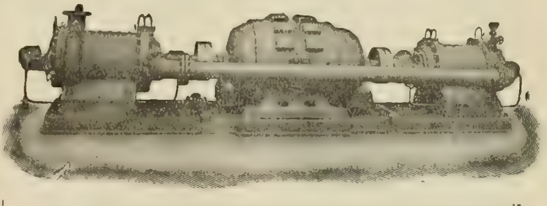

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that " Mr. Bleloch assumes that there is an unconformity at the base of the Ventersdorp System throughout the Witwatersrand and Heidelberg areas and that the Ventersdorp formation rests near Heidelberg on rocks several thousands of feet lower in the succession than it does on the northern flank of the Klipriversberg. Neither he or anybody else has brought forward any evidence to support this assumption.'' Dealing with this, Mr. Bleloch referred to Dr. Hatch's map (2nd edition), and pointed out that the Ventersdorp beds were shown by Dr. Hatch lying unconformably on lower Witwatersrand beds in the Bezuidenhout Valley and indiscriminately on upper and lower Witwatersrand beds at many other places both on the Rand and in the Klerksdorp and Heidelberg Districts. He also referred to the paper read before the Society by Mr. Luttman Johnson some ten years ago, describing an occurrence of the boulder beds of the Ventersdorp System to be seen on the northern side of Bezuidenhout Valley lying unconformably on the Yeoville Shales. He asked Dr. Rogers whether he agreed that these were Ventersdorp beds and if they were lying there unconformably on Witwatersrand beds. Dr. Rogers said that he agreed that they were Ventersdorp beds and that they were lying unconformably on the Witwatersrand beds, but he said the Ventersdorp beds are conformable to the Elsberg Series at Heidelberg. Mr. Bleloch asked Dr. Rogers whether he seriously put that forward as correct geology—that a later system of rocks could be both conformable and unconformable to an older system on which it lies. Dr. Rogers said it was what was known in geology as an unconformable overlap. If so, said Mr. Bleloch, this is new geology to me, and I think it must be new to everyone in this room. Surely Dr. Rogers must admit that the apparent conformity at Heidelberg is only accidental. Mr. Bleloch then said that he would not deal further with the geology of the paper that evening, but would discuss it in detail at a later meeting after he had had an opportunity of examining Dr Rogers' map and plans.

There were, however, one or two matters of a more personal character in Dr. Rogers' paper which he was compelled to refer to. He read two portions from Dr. Rogers' paper to the effect that Mr. Bleloch's map published in 1910 was constructed not as it should be on objective lines, but that it was framed to illustrate Mr. Bleloch's new reading of the geology, and that Mr. Bleloch by this and other methods put forward what Dr. Rogers called errors of correlation giving the public expectations which were not otherwise justified. Mr. Bleloch took exception to these statements and asked Dr. Rogers what he meant by them, as they contained the innuendo that he had made up his geology for the purpose of misleading the public. Dr. Rogers did not disavow this innuendo when it was thus put to him, and said I mean what I say there, pointing to his paper. Mr Wilkinson at this point asked whether this cross-examination was in order The Chairman said perhaps not exactly, but if it was to elucidate passages in the paper it was permissible. Mr Bleloch then referred to another passage in Dr. Rogers' paper which he said implied that he had dishonourably copied Dr. Hatch's map and was thus guilty of plagiarism. Here Mr. Bleloch referred to the first edition of Dr. Hatch's map and to a geological plan of the Witwatersrand, which he (Mr. Bleloch) had engaged Mr. M. E. Frames to prepare for him for inclusion in his book, " The New South Africa," published in 1900. In the first edition of Dr. Hatch's map there were several errors relative to the position of the Black Reef and the Ventersdorp beds which Mr. Frames corrected in the map he executed for Mr. Bleloch, referred to. Mr. Bleloch said Mr. Frames had done this work in a masterly manner, and he handed the map round to the members for their inspection. Dr. Hatch had adopted Mr. Frames' corrections in his next edition, published in 1903, but neither he nor Mr. Frames had ever complained of this.

In his (Mr. Bleloch's) map of 1910 he had adopted some further minor differences from Dr. Hatch's map in regard to these later formations from new data which had come to his knowledge, but had followed Dr. Hatch in regard to certain areas referred to by Dr. Rogers as being incorrectly mapped by Dr. Hatch, and he had done so because in regard to these areas he was of opinion that Dr. Hatch's mapping was in the main correct, and he might say further that he disagreed with Dr. Rogers' present reading and believed it to be wrong and Dr. Hatch's to be right. Surely he was justified in accepting as correct the mapping of so distinguished a geologist and petrographer as Dr. Hatch, especially when shown on a later edition of his map revised after six years further observative study. He was sure Dr. Hatch would be the last man to complain of his contributions to the common pool of geological knowledge being taken to be correct available for use by others. It was impossible for the ordinary man to visit every place on such a large area and he never pretended to have done so. His map of 1910 was, as stated, framed to illustrate a new reading of the Witwatersrand System, and surely no one would say—Dr. Hatch least of all that it was a copy of any previous map of the Witwatersrand Series, presenting as it did quite a different view on many important questions of the geology of that system.

Mr. Bleloch and the Society.

He asked Dr. Rogers if he meant to accuse him of plagiarism, and Dr. Rogers, replying to the Chairman, said that he did not see why he should answer that question. Mr. Bleloch then said: Mr. Chairman, I will know how to deal with Dr. Rogers in my own way in good time, but I warn you, as president of this Society, and I warn the members of this Society here present, that if these slurs and innuendoes which Dr. Rogers has not disavowed are published in the society's transactions, although as one of its oldest members I would be loath to do anything to injure this Society, I will have to take action. In my opinion these matters should be discussed in a scientific way—personalities and innuendoes are not in keeping with the character of the Society, and there was no reason why they should have been embodied in Dr. Rogers' paper. Later the Chairman asked Mr. Bleloch to mark the passages he took exception to so that the Council could be guided as to whether they should be cut out of the transactions of the Society. Mr. Bleloch said he would be glad to mark the passages as requested by the Chairman.

In publishing this statement we must in fairness to Dr. Rogers state that we are indebted to Mr. Bleloch for supplying this version of the proceedings and discussion at the Geological Society's meeting. No doubt Dr. Rogers will take the opportunity of replying to the discussion at the next meeting of the Society, and we shall then be only too pleased to give the same publicity to the Director's reply that we are now giving to Mr. Bleloch's account of the proceedings.

MINES DEPT. EXAMS., 1920—1921.
CERTIFICATES AWARDED INSTITUTE.

SURVEYOR'S CERTIFICATES March, July and October (Extra) Exams., 1920. 100 per cent., 50 per cent., and 66 per cent. respectively of S.A. total.
MANAGER'S CERTIFICATES. Two Exams (Sept., 1920, Jan., 1921), 17 out of total 28 in S.A.: 12 Certificates, (including coal), May, 1921.
OVERSEER'S CERTIFICATES.—Two-thirds of the S.A. total for year 1920, and also for the first six months of 1921 No metal failures during 1921.
COAL CERTIFICATES.—Ten Certificates (1921) obtained.

Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St.

Tanganyika Territory.

MINING REGULATIONS.

We are in receipt of the mining regulations recently promulgated by the Government of the Tanganyika Territory, formerly German East Africa. The new territory must not, of course, be confused with the country owned by the Tanganyika Concessions, which is part of the Belgian Congo. The new mining regulations under review seem to be largely based on the mining code of the old British East African Protectorate, now known as Kenya Colony, which marches with the former German Protectorate. The framers of the new mining regulations have not evolved " the ideal mining law " of which we have heard so much in South Africa lately, but they seem to have not done too badly in the circumstances, though they have not entirely escaped local criticism. Thus the *Dar-es-Salaam Times*, which seems to be the leader of local public opinion, says, *inter alia* :—

Sir Horace A. Byatt, K.C.M.G.,
Governor and Commander-in-Chief of the Tanganyika Territory.

" Our criticism of the Tanganyikan Regulations need not be too harsh, considering that they are the first in regard to mining this territory has enacted under the new regime; and improving amendments may be enacted from time to time as experiences teaches; but we are compelled to say that we would like to have seen them modelled more on the basis of the Rhodesian Mining Laws, which are about the most encouraging to the industry in Africa, at least.

" Under the new regulations, the prospector or mineral producer has too little in the way of actual *rights*, while too much power for restriction lies in official hands. According to our reading of the regulations, prospecting licence only entitles one to prospect, not to *produce* mineral wealth. Before he can win any minerals he must obtain a lease from Government over the area he has been prospecting. Under Section 49 of the regulations, ' the Governor . . . . may refuse such lease, or sanction the grant of same subject to any special covenants or additions.' For no apparent reason then a prospector who may have spent a couple of years opening up valuable ground could quite easily be refused a lease, in which case his claim would be deemed forfeit, and the expense and labour of the past would be lost to him. In other words, he would have done his prospecting for the Government, at his own expense. We believe the main reason for this restriction is that Government desired to meet the persistent urging for granting prospecting facilities, while at the same time protecting themselves against any claims which might come in between now and September (the date fixed by an earlier proclamation) for any land which may subsequently prove to be excluded from prospecting. In such circumstances, of course, one can see the necessity for the restriction, but we trust that after the date fixed, the clause will be amended to grant prospectors definite rights on that question to produce minerals from the ground held under his licence, and that his title were irrevocable for as long as he created no breach of the regulations. Under the South African Law (Act 35 of 1908), the Prospecting Claim Licence is a definite title, which, on the producing stage being reached, is converted into a Prospecting and Digger's Claim Licence, and, pending compliance with the regulations, is irrevocable.

" In the new regulations there are no provisions for Water Rights. The Controller may or may not grant permission to divert water from streams, as he thinks fit. So a prospector may do a lot of prospecting work, may succeed in obtaining a lease and in developing a great amount of valuable ore, and then may be refused by the Controller the water that is necessary for production operations.

" The question of Royalty next claims our attention. A royalty of 5 per cent. of the value of the ore as raised to the surface, and *before treatment*, is leviable by Government. This is an unfair and impracticable condition. In the first place, it would mean constant assays being made of all ore raised to the surface which would be too onerous and costly to the average ' small ' worker.

" We also notice there is no provision for awards to genuine discoverers except for Government officials. When new minerals are discovered in areas where none were found before, an award of clear titles to a portion of that ground, subject to certain working conditions, is usually granted. This encourages prospectors to open up unknown areas. After all, the fundamental principle of Mining Legislation is to encourage, not to hinder, the exploitation of a country's mineral resources.

" On the whole, however, we welcome the Mining Regulations as being a step in the right direction, and look forward with keen interest to results."

Rhodesia Gold Mining and Investment.

The report for 1920 states that, in view of the loss realised by the company as a result of the liquidation of the Sabie Gold Mining Co., Ltd. (in which this company had practically one half of its capital invested), and the amounts which have to be written off against the cost of the Pretty Polly and Felixburg properties, which have now been abondoned, an extraordinary general meeting will be held on May 27, when a resolution will be submitted for the reduction of the capital from £300,000 to £150,000, by reducing the nominal value of the shares from £1 to 10s. each. The accounts for the year show a realised loss of £130,529. After making appropriations for capital expenditure written off and deducting the share premium account and credit balance brought forward from last year, the appropriation account shows a net loss of £150,000. If the proposed resolutions for the reduction of capital are duly passed, this debit balance will be extinguished, and all profits thereafter realised will be available for the distribution of dividends.

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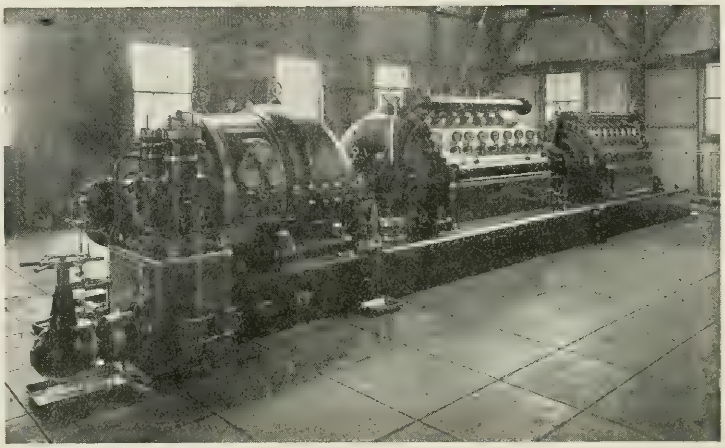

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" Southads."

Enemy Shares.

POSITION OF THE GOVERNMENT.

Custodian's Evidence.

Before the Select Committee on Public Accounts the Custodian of Enemy Property (Sir Walter Hamilton Fowle) gave the position of enemy shares up to the 31st March last. The cash invested at 31st March, 1921, was approximately £6,600,000, and most of the funds invested in the banks on deposit when the Auditor-General's report was written have been converted into Treasury bills, carrying 4 to 5 per cent., the current rate of interest. The total amount in Treasury bills was about £5,300,000. They had slightly reduced the amount invested in the Government loan, and the total now is £960,000.

Chairman: What is the position in regard to claims which have been sent into you? I mean claims against enemy subjects?—There are several forms of claims: Debts which are due to our nationals by German nationals have been paid; they are practically finished. In addition, there are claims by our nationals against the German Government under more than one heading: Merchandise lost at sea, for instance. We have no power under the Peace Treaty to pay those out of enemy funds, because they are claims against the German Government, and we cannot meet them until we are paid by the German Government. We have, of course, lodged our claim against the German Government through the Reparations Commission for these, and for our pensions and separation allowances. That claim was put in over a year ago. It amounts to seven millions.

Chairman: For what period do you capitalise pensions?—They are worked out on a scale agreed to by the War Council in Paris, and worked out on the French scale, and some day we shall get our *pro rata* share. Then there are claims against the German Government in connection with shipping disasters, loss of life and personal effects, and there again we had no power under the treaty to deduct them from assets in our hands, but the Government decided to pay compensation out of Treasury funds. When we get in all the claims it may cost us about £100,000 to £120,000, and up to the present we have paid out about £50,000, but claims are continually coming in. The money, which I am advancing in the meantime, will ultimately be debited to the German Government. Our scale of compensation for loss of life is £500 for the breadwinner, but that amount may be increased later on if other Powers place it at a higher figure. We are the only Government up to the present who have paid anything at all. The French, American and British Governments have discussed the matter, but they have not paid anything. Another set of claims is in respect of property in Germany—property belonging to Union citizens, and which property has been confiscated by the German Government. Before issuing our certificates—which we refer to as credit certificates—we deduct for this purpose 5 per cent., which we keep back to compensate our nationals. If, later, we find out that such property has not been confiscated, then the German nationals will get extra certificates for this amount.

Mr. Webber: Supposing a British national owes a German national £100,000 and some other German national owes him £50,000, is he allowed to set off one against the other?—He pays me what he owes to the German national, and I pay him out of the funds which the Peace Treaty provides for. It is really a cross entry.

South-West African Diamonds.

Mr. Merriman: Had you anything to do with the proceeds from the diamonds in the South-West Protectorate, from mines which were worked by the Union Government's permission?—I have £600,000 which were profits and interest paid over to the Administrator of the Protectorate, and which are being dealt with in exactly the same way as the Union assets.

I am speaking of the working of the mines under an agreement which permitted them to work. Part of the money went to pay the expenses of the country?—I do not know how the money was expended. I had to take over a certain amount which was on deposit in the German banks, which I understood was earned by these mines which were working, and which was dealt with under the Proclamation I have referred to. I have nothing to do with proceeds of sales effected through the Diamond Syndicate.

That does not come under the proposal made to pay out of the four per cent. bonds?—The amount which becomes payable is the £600,000 which, I understand, was profit earned by these companies working by arrangement of the Administrator or the Union Government. I believe they had to work them, and if they did not do so the Government would work them. That was the real position, I believe.

Shares Valued at Three Millions Left.

Mr. A. P. J. Fourie: The Prime Minister made a statement in the House that ten millions was in the hands of the Custodian; you say it is five millions?—Those were the total assets (the ten millions), and a lot of them have not yet been liquidated. I have still large blocks of shares—some valuable and others rubbish. The total assets, I should say, roughly, are between nine and ten millions. They had released the property of Germans resident or domiciled in the Union at the outbreak of war to the value of approximately four millions, including the assets of the German missions.

Effect on Market.

Chairman: A statement was made to the effect that you would be ruining the market by placing them on the market at an unsuitable time?—There were reports and rumours to that effect. As a matter of fact it was stated and suggested that owing to the fact that these shares were to be realised the market had fallen, but it was not so. The market fell owing to the financial position all over the world. The number of shares in the hands of the Custodian has been known for the last five years, and periodically the Custodian has issued reports to Parliament which show the exact number of shares in every particular mine, and financial institutions knew the number of shares and that they would have to be disposed of. In fact, in five companies we have already sold the enemy shares.

Mr. Merriman: A lot of the shares held by enemies in these diamond companies are bearer shares. Would you regard those as enemy shares?—You refer to the Pomona Company. They were shares in a company which was legally an enemy company. The people who purchased those shares are in no better nor in a worse position than the Germans who held them. They were enemy shares and, therefore, they have to take certificates for the profit earned on those shares. If a British subject held those shares at the outbreak of the war he would get cash, but if he purchased them since then, he is in no worse position than the German shareholder was or is.

Supposing he bought these shares after they came under your dominium or since the armistice, would he be in the position of an enemy?—He would be in the position of having to take Union stock, because he has purchased a share in an enemy company and has to take the consequences. It is the property they were dealing with and not the individual. That is the legal position. The British subject bought with a full knowledge of the peace terms.

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EDITORIAL.

THE TEMPLES OF TALK.

The lengthy article entitled "The Land Without a Leader," which appeared in our last week's issue, has aroused very considerable interest all over the Union, and we have received many messages of congratulation from various parts of South Africa, and particularly from Johannesburg, for having said what, most people are agreed on, urgently needed to be said. Perhaps the most effective tribute of all is to be found in the fact that, although an extra large edition of the issue was printed, we have been unable to satisfy demands for the number. Orders for twenty, thirty, forty, and fifty copies have been telegraphed us from several towns in the country, and we regret that we are unable to comply with all the requests made. Several letters—some of which are confidential and, unfortunately, not for publication—have reached the editor on the subject of the article, and although we are not permitted to make use of several of the communications which we have received, we propose in our next week's issue to publish one or two views which have been expressed on the matters raised in "The Land Without a Leader." Meanwhile we observe that the Parliamentary harangues have been continuing, particularly on the unemployment vote of £300,000. In a country like the Union of South Africa it is a reflection on the Government that it should be necessary to provide one single penny for out-o'-works, soup kitchens, and free meals. It is a reflection, too, on our leaders of industry that in a land so wonderfully endowed with wealth as this is that there should be a single man who really is looking for work and is unable to gratify his labouring desires.

We quite agree with Mr. Boydell that work is what is wanted, and not charity. On the other hand, Mr. Boydell's Labour Party is in no small degree responsible for the prevailing state of affairs. We do not altogether regard our Acting Prime Minister as a heaven-sent statesman, but we find ourselves quite in agreement with him when he remarked: "Let me say at once that I have it on the very best authority that a large amount of building would go on to-day if the price of labour was at all in conformity with the cost of living at the present time. That is the information I have as Minister of Industries, and I am informed that as a matter of fact material has come down in price considerably, and it would be possible to build houses privately to-day if labour was cheaper; but labour, organised labour, is still to-day higher than it was during the height of the War. The result is that people who have the money, land and material are hanging back simply because the cost of labour is so very expensive. If people will not reduce the standard of wages in accordance with the cost of living, you must expect that there will be unemployment."

The end of all this fine oratory was that the vote was passed, and the record of the Government continues unblemished in respect of one single piece of constructive legislation in its first session. If the country has three hundred thousand pounds to throw away, why does it not make a start on double-tracking some portions of our obsolete railway systems or on the partial bridging of the missing link between the Messina Mine and Southern Rhodesia?

So much for the orators in the House of Assembly. As to the mines, there has been more "talky, talky" between the Chamber and the Trade Unions on the subject of reduced wages. A further conference between the Chamber of Mines and representatives of the Department of Mining Industry of the S.A. Industrial Federation and the unions concerned took place on Tuesday, and was stated to have adjourned without having arrived at any decision. We understand the points raised in the latest statements which had been issued on both sides were the subject of full discussion, the proceedings being conducted "in very amicable spirit on both sides." The end of the discussion came, however, without any decision having been reached, and it was then decided that the conference adjourn. On Thursday morning it was announced in the daily Press that at the conference on Tuesday between representatives of the Chamber of Mines and the South African Industrial Federation, the Chamber withdrew its claim for a reduction of wages of 3s. per shift. According to an official statement given to the "S.A. Mining Journal" by an official of the Chamber, this is not the case, as it is therein definitely stated that the Chamber's representatives could not consider the withdrawal of the request. The concession the Chamber is prepared to make is set out in a letter to the Industrial Federation, in which the Unions are asked to accept, from August 1, half the reduction proposed—the other half to be the subject of further discussion. The next stage in this laborious business will be, we suppose, the consideration of this latest offer by the executives of the men, who will probably require a conference to invite the Chamber of Mines to state whether August 1, 1921 or 1922, is referred to in the Chamber's statement, and to appoint a commission to decide whether one-half of three shillings is one and six or eighteenpence!

The whole business is becoming so long drawn out that it is beginning to savour of the interchange of notes between America and Germany in 1915 and 1916, and the general public are beginning to wonder whether a decision will be arrived at before gold again advances to 120s. an ounce. Even if such a price is reached it will not do away with the necessity that exists for reducing working costs and increasing efficiency in and on our mines. It seems to us that the Industry would be much the better for more action and less talk both in regard to the employers and employees. And in this connection we are glad to welcome Colonel Raymond Ffennel back to Johannesburg after an absence of some years. We do not know how long he will be with us, or what the precise objects of his visit are, but we think and hope that his lengthy experience of the Rand, coupled with the authority and mature judgment which he gained during his association with the leading mining corporation of South Africa will be of material assistance to the Industry at a time when so many discordant voices are heard, and when so little action that is wise or progressive is to be seen

THE DIAMOND MARKET OUTLOOK.

A feature of the improving market of the past week has been the much better tone in the diamond section, which has been in the doldrums for some months past. Despite the gloom which still prevails in Europe, there is a generally widespread belief that the diamond market is likely to show considerable improvement in the near future. The restriction of sales by the selling syndicate which has disposed of no diamonds this year is bound to have its influence on the price of and volume of demand for gem stones. There is, of course, a normal and continuous demand for diamonds as well as a boom period such as was experienced in 1919 and the early part of 1920

As long as marriages are contracted in the world-wide custom of an engagement [illegible]

[illegible]

[illegible] the South [illegible] African [illegible]

[illegible]

Notes & News.

Free State Gold.

A well-known prospector writes to us that lately when he was in the Free State he came across a farm carrying a quartz lode which seems geologically to be in the same position as Strubens' reef, north of the Rand, as it underlies that of the Witwatersrand formation at Parys. Samples were taken from the outcrop and assayed by Mr. James Gray, of Johannesburg, the result being 12 to 15 dwts. of gold to the ton. It is said that about 32 years ago a shaft was sunk on this lode in which a reef pocket was struck, and a trial crushing of twenty tons gave twelve hundred ounces. Our correspondent secured an option over the farm, and we will put anyone into communication with him who would care to tackle the proposition. The same correspondent has rights over 1,330 morgen of coal land close to Meyerton station. The seam of coal is said by competent engineers to be the same as that worked by the Cornelia Colliery. Anyone who may be interested can have the name of our informant on application.

* * * *

A Mining Cause Celebre.

A test case of unusual mining and financial interest was heard in the Rand division of the Supreme Court this week. The case was brought by the Crown Mines, Ltd., against the Commissioner of Inland Revenue, to decide whether moneys paid in redemption of a debenture issue are taxable under the Income Tax Act. In point of fact, the tax had already been paid, and the action was for a refund of the amount so paid. The Crown Mines debenture issue was in course of reduction by annual redemptions of approximately £80,000; and it was on the money expended in so redeeming the debenture issue that the company said dividend tax was not chargeable. The company claimed a refund of the tax paid respecting the debentures redeemed in 1917, 1918 and 1919. After negotiations between the parties the Commissioner had offered to admit the claim for a refund in respect of 1919, but in regard to 1917 and 1918 he held that the tax was rightly levied. Mr. Saul Solomon, K.C., and Mr. Stallard, K.C., argued the case at great length, and Mr. Justice Ward has reserved judgment

* * * *

Oil Technology.

The advent of the oil age will mean that greater attention will have in future to be devoted to this subject in our technical colleges and schools. This point was well brought out by Mr. [illegible], the new president of the Institution of Mining and Metallurgy, in his recent inaugural address. Discussing the subject of oil, he said: "This is [illegible] A student at the Royal School of Mines can [illegible] and qualify [illegible] their college course to obtain [illegible]"

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Engineering.

Electric Shunting Locomotives.—Iron and Coal Trades Review, June 3, p. 757.

The Uses of Stainless Steel.—The Engineer, June 3, p. 598.

Heat Treatment of Rock Drill Steel.—Colliery Guardian, June 3, p. 1599.

Railway Electrification.—The Engineer, June 10, p. 622.

Electricity Supply Problems.—Electrical Review, June 10, p. 737.

Coal.

Froth Flotation Applied to Coal.—Canadian Mining Journal, May 20, p. 405.

Sulphur in Coal.—Iron and Coal Trades Review, June 3, p. 751.

Coal Dust Sampling.—Iron and Coal Trades Review, June 3, p. 753.

Characteristics of Outbursts of Gas in Mines.—Colliery Guardian, June 10, p. 1663.

Control of Atmospheric Conditions in Hot and Deep Mines.—Colliery Guardian, June 10, p. 1665.

Metallurgical Coke.—Colliery Guardian, June 10, p. 1668.

Economics.

"The Gold Standard."—The Statist, June 4, p. 1049.

THE METAL MARKET.

London, July 2.—[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] and the United [illegible] sold for [illegible] delivery. The offerings from the American Continent were not important, but some heavy Continental sales are expected shortly.

THE SHARE MARKET.

Local Closing Prices.

The Johannesburg Market was steady at the close on Thursday.

	Buyers. s.	d.	Sellers s.	d.	Sales s.	d.
Anglo-Americans	18	3	18	3		-
Bantjes	5	0	5	3		
Con. Diamonds	12	9	13	0	12	10½
Coronation Syndicates	7	0				–
City Deeps					11	3
Crown Diamonds	2	8				
Cements	—				16	9
East Rand Deeps	0	7				
East Rand Minings	7	6				
Gedulds					19	6
Modder B's	25	6			25	9
New States	23	6			23	0
New Modders					64	0
Randfonteins					11	6
Southern Van Ryns	2	8				—
South African Alkalis					17	6
S.A. Townships	10	0	10	6		-
Transvaal Silvers	26	3	26	6		
Van Ryn Deeps	66	6	66	9		
West Springs	11	3				
Wolhuters	3	4			3	5
Wit. Deeps	—		8	0		
[illegible]	10	9				
[illegible]			99s			
[illegible]	[illegible]					
[illegible]	1	6	——			
[illegible]	1	[illegible]	2	0		
[illegible]						[illegible]
Sakalavas	2	3	——		——	
[illegible]	1	1			——	

[illegible]

LATEST SHIPPING INTELLIGENCE.

[illegible]

[illegible]

[illegible] Kent, [illegible] July 6, [illegible] July 6, Singapore [illegible] Simonstown. [illegible] Bombay.

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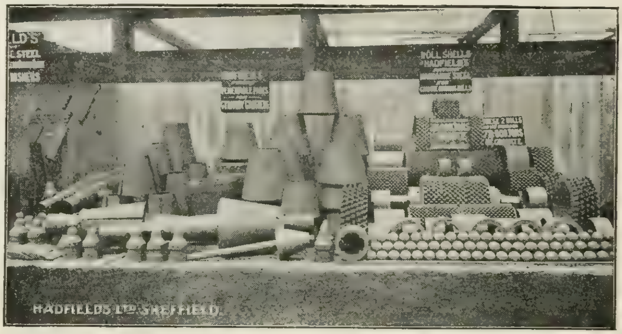

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VIEW OF GENERAL ASBESTOS WORKS, HAREFIELD, MIDDLESEX.

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Over 170 million square feet of "Gladiator" Building Material supplied the British Government during the War for Army Hutments, Hospitals, Aerodromes, Munition Factories and the like.—Enquiries invited.

May Gold Output : Group Returns.

CENTRAL MINING/RAND MINES GROUP.

Company.	Tons crushed.	Yield in Fine Gold Ozs.	Estimated Value.	Estimated Profit.	Estimated Working Costs per Ton.
City Deep	85,500	36,128	£191,944	£60,843	30/ 8
Cons. Main Reef	49,200	16,866	89,600	12,949	31/ 1
Crown Mines ..	190,000	54,33[illegible]	288,66[illegible]	54,952	24/ 7
Dur. Rood. Dp.	27,000	9,195	48,848	4,387	32/ 11
E.R.P.M.	123,500	33,034	175,493	5,012	27/ 7
Ferreira Deep ..	32,300	10,620	56,420	12,646	27/ 1
Geldenhuis Dp.	45,668	12,423	65,773	1,157	28/ 3
Knight Central.	28,100	6,816	36,208	2,930	23/ 8
Modder B.	57,500	32,556	172,956	100,144	25/ 3
Modder East ...	24,100	9,753	53,281	12,604	33/ 9
New Modder ...	96,000	45,103	239,617	127,778	23/ 3
Nourse Mines ..	42,000	13,561	71,942	2,965	32/ 10
Robinson	42,000	7,905	42,002	2,494	18/ 9
Rose Deep	53,500	13,876	73,610	11,755	23/ 1
Wolhuter	32,600	7,842	41,376	4,220	22/ 9
Village Deep ...	47,000	15,212	80,695	10,721	29/ 9
Tls. & averages	975,968	325,227	1,728,430	427,557	26/ 7

East Rand Proprietary Mines: Decrease due to accident to hoist already reported.

Modder East: 31,489 tons handled at the mine, of which 19,116 from stopes, 2,028 sorted at the mine; total transported to Apex, 29,461.

General Note: The valuation of gold has been taken at £5 6s. 3d. per fine ounce.

BARNATO GROUP.

Mine.	Tons Crushed.	Revenue from Gold.
Consolidated Langlaagte	44,300	£67,905
Government Areas	129,000	275,556
Langlaagte Estate	40,200	65,700
New Primrose	21,600	23,814
New Unified	11,200	13,571
Randfontein Central	123,500	201,427
Van Ryn Deep	51,000	144,526
Witwatersrand	37,400	53,995
Total and averages	458,200	£846,494
May totals	449,300	£813,722

Mine.	Total Working Costs.	Working Costs per Ton Milled Shillings.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte ..	£51,425	23·217	£16,782
Government Areas	146,034	22·041	130,329
Langlaagte Estate	52,689	26·213	13,469
New Primrose	21,314	19·735	2,671
New Unified	11,412	20·378	2,213
Randfontein Central	171,323	27·745	31,322
Van Ryn Deep	70,665	27·712	75,011
Witwatersrand	45,514	24·339	10,004
Total and averages ...	£570,376	24·896	£281,801
May totals	£568,596	25·310	£250,000

Note.—The above results are arrived at by calculating the gold at £5 7s. 6d. per fine ounce.

Monthly Gross Profits.—January, £269,638; February, £187,423; March, £253,627; April, £261,506; May, £250,000; June, £281,801.

GENERAL MINING & FINANCE GROUP.

Company.	Tons Crushed.	Total Cost.	Cost per Ton.	Total Revenue.	Profit.
Aurora West ..	10,640	£14,503	27·26	£15,287	£784
Meyer & Charl.	13,000	17,527	26·96	41,198	23,671
New Goch	17,300	19,322	22·34	20,131	809
Roodepoort Un.	22,200	25,143	22·65	24,718	*425
Van Ryn Est. .	32,200	40,671	25·26	51,841	11,170
West Rand Cn.	32,000	44,628	27·89	49,137	4,509
	127,340	£161,794	25·41	£202,312	£40,943
				Less loss	425
					£40,518

* Loss.

In calculating the revenue, gold has been taken at a value of £5 7s. 6d. per fine oz., less estimated realisation charges.

Van Ryn: The profit includes £2,238 from farm revenue for the financial year.

West Rand Consolidated: Both tonnage and grade were adversely affected by a derailment in the Rand Shaft, which caused a week's suspension of hoisting from that section.

CONSOLIDATED MINES SELECTION GROUP.

	Stamps Working.	Tons Milled.	Working Costs per Ton Milled.
Brakpan Mines	110	53,700	27/ 5·18
Springs Mines	80	41,500	29/ 2·06
Totals and averages .	190	95,200	29/ 2·28

	Value of Gold declared.	Yield per Ton.	Working Profit based on standard value of Gold.	Working Profit per Ton.
Brakpan Mines ...	£88,343	32/10·82	£14,689	5/ 5·64
Springs Mines ...	79,373	38/ 3·02	18,841	9/ 0·96
Totals and averages	£167,716	35/ 2·81	£33,530	7/ 0·52

	Estimated Premium. taking Gold at £5 7s. 6d. per fine oz.	Total Estimated Profit.
Brakpan Mines	£22,827	£37,516
Springs Mines	20,568	39,409
Totals and averages	£43,395	£76,925

Miners at Work in a Rand Deep Level.

CONSOLIDATED GOLD FIELDS.

Company.	Stamps. Running.	Tube Mills.	Tons Crushed.	Gold declared. Fine ozs.	Profit.
Simmer and Jack ..	320	7	61,400	14,136	£13,851
Robinson Deep	155	9	56,300	17,404	17,765
Sub Nigel	30	2	7,500	5,698	6,419
Totals	505	18	125,200	37,238	£38,035

Gold in reserve: Simmer and Jack, 1,200 ozs.; Sub Nigel, 2,330 ozs.; total, 3,530 ozs.

The revenue derived from gold for the month of June is calculated at the rate of £5 7s. 6d. per fine oz., less estimated gold realisation and exchange charges of 1s. 6d., or a net figure of £5 6s. per fine oz.

UNION CORPORATION GROUP.

Company.	Stamps.	Tons Crushed.	Fine Ozs.	Total Revenue.	Reve nu per Ton
Geduld Proprietary .	100	44,500	14,815	£79,905	35/11
Modder Deep	70	42,600	23,884	127,371	59/ 9
Totals	170	87,100	38,699	£207,276	—

Company.	Costs.		Profit.	
	Total.	Per Ton.	Total.	Per Ton
Geduld Proprietary	£53,371	24/ 0	£26,534	11/11
Modder Deep	47,263	22/ 2	80,108	37/ 7
Totals	£100,634	—	£106,642	—

The above results are arrived at by calculating the gold produced at £5 7s. 6d. per fine ounce. Realisation charges in excess of normal are debited direct to revenue.

GLYNN'S LYDENBURG.

The following are the particulars of the output for the month of June, 1921, in respect of the above company: Tons crushed, 3,385, yielding 1,450 fine ozs.; estimated value of month's output, £7,710; estimated profit for month, £1,837. The month's results are based on a value of £5 6s. per fine oz. net.

TRANSVAAL GOLD MINING ESTATES.

Central Mines: Tons crushed, 12,200, yielding 2,820 fine ozs.

Elandsdrift Mine: Tons crushed, 1,520, yielding 961 fine ozs.

Vaalhoek Mine: Tons crushed, 1,870, yielding 606 fine ozs.

Estimated value of month's output, £23,282; estimated profit for month, £1,263.

The month's results are based on value of gold at £5 6s. net per fine oz. Reduced profit due to lower grade Central Mines.

Victory Hill Restarts.

The Victory Hill Mine is one of the oldest gold mining propositions in the Barberton district. For about thirty years it has been in life, and during that time has changed ownership several times, those interested being private individuals at one time, and limited companies on other occasions. From the point of view of profitable results the mine has met with varying success, but it has always been a favourite with mining men, and when given up by one owner has been readily taken over by another. Few mines in the district have inspired so much faith. Up to about six months' ago the property was in the hands of a local syndicate, who disposed of it to Mr. Genussow, of Barkly West, and Mr. Eppel, of Barberton. On assuming control these latter gentlemen decided to abondon the old method of power supply, which consisted of a suction gas engine plant. The water-right of the old Clutha mine at the Queens River about three and a half miles from the mine was secured and an electricity generating plant driven by water and turbine was installed on the side of the old Clutha battery. The battery at present consists of five stamps each 1,750lbs. The whole of the plant was erected by the mine staff under the supervision of Mr. Eppel, and was started formally on Wednesday afternoon when a number of Barberton residents and Government officials journeyed to Clutha.

The following circular, dated 9th June, has been issued in London by the Harmony Proprietary company to shareholders:—"Mr. J. F. Stewart, the company's general manager, arrived in the Transvaal at the end of March. The first matter to occupy his attention was the position between this company and the Officers' Land Company, Ltd. (Transvaal company), who had acquired the four farms sold by us in July last and two other farms adjoining. The officers had incurred considerable initial expenditure, and it had become apparent that the funds at their disposal would not admit of their completing the purchase of, and adequately developing the whole of the large area (upwards of 40,000 acres) which they had acquired. As a result of negotiation your directors have therefore judged it politic to cancel the sale agreements of July last, convey farm Luxemburg to the Officers' Company, in consideration of payments already received, lease to them farm Dusseldorf with an option of purchase, and take back the two farms Munchen and Lunenberg. These concessions which were strongly urged on by our general manager, have enabled the officers to obtain the financial and managerial assistance of a leading South African group, whose co-operation should have a very beneficial effect on the development of the whole of our territory, as well as directly on the progress of the Officers' Company.

RAND WATER BOARD.

Notice No. 84.

VAAL RIVER SCHEME —CONTRACT No. 208.

TENDERS ARE HEREBY INVITED for the suppiy, delivery and erection at the Board's Main Pumping Station, Vereeniging, of:—

(a) Two Steam Turbo-Centrifugal Pumps, with Condensers, Piping and all Accessories.

(b) One 10-ton Travelling Crane.

For particulars apply at the Office of the CHIEF ENGINEER, RAND WATER BOARD, where copies of the Contract Documents may be obtained, on and after **Tuesday, the 12th July, 1921,** upon a deposit of £5 5s. per copy, which amount will be returned on receipt of the documents and a bona-fide tender. Additional copies of the documents may be obtained on payment of £1 1s. per copy, which amount will not be returned.

No tender will be considered unless accompanied by the deposit referred to in the form of tender.

The Board is not bound to accept the lowest or any tender, and may, if it so desires, divide the contract between two or more Contractors.

All tenders are to be deposited at the Office of the Secretary, Rand Water Board, 2nd Floor, Central House, or P.O. Box 1703, Johannesburg, before 12 noon on Tuesday, the 25th October, 1921.

No extension of time can be granted.

W. INGHAM, M.Inst.C.E., M.I.Mech.E.,
Chief Engineer.

Johannesburg, 6th July, 1921.

South African Association of Analytical Chemists

In the course of his interesting presidential address Dr. J. Lewis, M.A., B.Sc., remarked at the ninth annual general meeting of the S.A. Association of Analytical Chemists on Tuesday, 28th June, 1921:—

Before I come to the main subject of this address, viz., some of the problems and interests of toxicology which have come into my own experience during the last few years, I should like to refer very briefly to certain aspects of our profession in the light of modern economic and social ideas.

The nineteenth century, with the birth of the factory system, witnessed the birth and growth of industrial organisation to replace the old guild system of the middle ages. The present century sees the development of organisation in *every* sphere of economic activity: teachers, Government employees, clerks, shop assistants, play-actors are all in progress of organisation, and it behoves every chemist who desires to obtain fair recognition for his labours to co-operate in the organisation of his own particular profession. The attitude that association is undignified, unworthy of a scientific profession is still held by a few ultra-conservatives, but with the passing of the present generation it will be as dead as the dodo. Among the younger generation the position is fairly well recognised, but more interest in the affairs of the profession is required, and can best be stimulated by the recruitment of the young and energetic. It is hoped that all entrants to the profession will join the association as a matter of course, and take an intelligent part in its activities.

During the past few years the presidential addresses have dealt adequately with the position and the importance of the chemist in modern civilisation, together with the awakening of the British world to the value of the science in all branches of industrial activity; and it is being realised that the day of the more or less hand-to-mouth chemist, who has picked up his knowledge in a works or analytical laboratory, who sometimes does or does not put F.C.S. after his name, is passing, and that a sound scientific education is an essential foundation for workers in our science. It cannot be too strongly urged upon young aspirants to use every effort to obtain a good scientific training in chemistry and its cognate sciences, at a University or Technical College.

It is gratifying to note that in South Africa the Government has taken a step forward towards the improvement of the status and conditions of employment of its chemists.

American and South African Salaries.

A recent Congressional Commission of the United States finds that there is serious discontent and an excessive loss of the best scientific employees from the service, and recommends that to remedy the alarming state of affairs every effort should be made to stimulate research, and investigation by the "reduction of red tape to a minimum," and the employment of thoroughly trained investigators, and independent thinkers of the highest type. The scales of pay are to be improved, and the subjoined list shows the maxima of the new scales compared with those of the basic scale recently adopted and at present in vogue in the Union of South Africa (the pound sterling being taken at 4 dollars, and at parity, 4.86 dollars respectively):—

American.		Equivalent.		South African.
	$	£1 = $4	£1 = $4.86	
Junior Cehmist	2,160	£540	£445	£400
Assistant Chemist	3,000	750	617	550
Associate Chemist	3,840	960	790	750
Chemist, Senior (no fixed scale	5,400	1,260	1,038	900 and 1,100

No fixed scale for seniors is proposed, as that would militate against the engagement of the best men.

The number of grades into which the chemical service is divided and the terminology is different in the two countries: I have chosen corresponding grades for comparison.

It is difficult to compare South African and American values, but the report gives the pay of the skilled mechanic in the States service as £600, which is somewhat higher than that earned by the mechanic in South Africa.

It is noteworthy that the Commission recommends Joint Advisory Council on the lines of the British Whitley Council, a principle which has also been recommended for the Union service as a whole by the Public Service Commission of Inquiry in its recently issued final report.

Further remarks on the general aspect of our profession are unnecessary here, and I pass on to the toxicological matters which I propose to bring to your notice.

Toxicology.

The problems of toxicology in South Africa are of great interest and of great importance, but, alas! while the analyst recognises the interest, the employer does not recognise the importance. Two sides of the subject should make special appeal, one which concerns the agriculturist, who suffers loss of stock from noxious plants, and that which affects the judiciary whose courts have frequently to deal with cases involving native poisons. My work has lain in the latter direction, but the difficulties, the discouragements and the methods of attack are the same in both cases.

Acocantherin.

One of our commonest native poisons, acocantherin, affords an instance of what has been done and how little has been done in South Africa on South African toxicology.

The active principle of the shrub acocanthera has been known throughout South Africa, and up to the East Coast as far north as Somaliland as an arrow poison, snake-bite cure, cattle tonic. Recently I received a specimen from the Transkei under the name "Bushman arrow poison," with the information that it is used as a preventive of infection by the natives when eating meat of animals that have died of anthrax.

Following the lines of Fraser and Tillie in their masterly study of *A. Schimperi, Juritz,* working on *A. venenata,* found that the toxic glucoside contained in the plant gave a violet colour with sulphuric acid, which is similar to that obtained by Fraser and Tillie with *A. Schimperi.*

This reaction is not endorsed by later workers—(Faust, Dunstan)—and the colour reaction is probably due to impurities. From *A. venenata* I have prepared a gucoside whose toxicity to guinea pigs is 1,500,000, which does not give the colour reaction.

The most convenient method of extraction is the following:—

The material is extracted with alcohol, neutralised if necessary, and evaporated below 40°C. in a partial vacuum. The extract is treated with water, filtered, the filtrate precipitated with lead acetate, a little ammonia added and filtered. The filtrate is precipitated with carbon dioxide, filtered and evaporated in vacuo to a small bulk. The liquid is then precipitated with solid ammonium sulphate, the precipitate dissolved in alcohol and reprecipitated with ether, and these processes repeated until the product is reasonably pure.

The glucoside acocantherin is decomposed by dilute acid into rhamnose and a chloroform—soluble substance.

A problem that remains for solution is the fate of the glucoside in the body and whether it can be recognised by its products of decomposition.

Arrow Poisons.

Acocantherin is a constituent of Bushman arrow poison; specimens of arrow poison (obtained from the South-West Protectorate in 1917) of Bushman and Ovambo origin have been examined by me, and in one instance I obtained from a specimen of arrow poison of the Kung tribe of Bushman a glucoside, which from its action on the heart appeared to be acocantherin.

Other ingredients of Bushman arrow poison are snake-venom, euphorbia juice, and the juice of the larva of a certain beetle.

Whether snake venom and acocanthera are used together is unknown to me. Although acocanthera is used by natives as an antidote for snake venom, its use in this connection depending on the powerful stimulant effect that acocanthera exerts on the heart, it is by no means impossible that the Bushmen use both poisons together on their arrows.

Euphorbia juice contains an irritant resin, but it is probably used principally as a cement.

Of great interest is the fourth ingredient, the juice of the larva of the beetle *Diamphidia conusta fairmaire (diamphidia simpleR lering)*. I have only been able to secure two of these larvae and test their toxicity and resistance to heat, and my results agree with those of German observers; from these latter it is established that the poison is soluble and conveniently extracted by physiological salt solution (0.85 per cent. NaCY) from the larvae. It is probably a toxalbumin and acts directly on the blood, killing the leucocytes and dissolving the red corpuscles. It has no action on albumen, and its activity is destroyed by 10 minutes heating at 65°C. Injected into the blood its action is far more rapid than on subcutaneous injection; twelve milligrams of the poison killed rabbits by intravenous injection in a few minutes, while after subcutaneous injection death occurred only after days. Birds are more resistant than animals; thus no effect was produced on a hen to which had been administered 20 times the dose that was fatal to a rabbit. The post-mortem examination of these animals invariably showed severe inflammation of the kidneys and the intestines (not usually the stomach), with bloody urine. Lungs and liver were usually deep red.

Animals can be rendered immune to this larval poison by repeated graduated injections until one hundred times the lethal dose can be injected with impunity.

In vitro 0.1 cc. of such immune sera neutralised completely the haemolytic action of 0.05 cc of the poison, a quantity sufficient to haemolyse 50 cc. of normal rabbit's blood.

Animals injected intravenously with 0.1 cc. of the immune serum and 0.02 cc. (4 times a fatal dose) of poison showed no signs of sickness.

It is possible, therefore, to produce a physiological antidote to at least this constituent of Bushman arrow poison.

(To be continued.)

REVIEW.

"*First Aid and Rescue Work in Mining.*" By Louis G. Irvine, M.A.M.D., B.Sc. (Pub. H.), Edinburgh. Published by S.A. Red Cross Society, Johannesburg.

We have received from the publishers, the S.A. Red Cross Society, a copy of this excellent work. It is divided into two parts—No. I., General Course in First-Aid, and No. II., First-Aid and Rescue Work in Mining. Dr. J. S. Haldane contributes an appreciation by way of preface, and pays a high tribute to Dr. Irvine's work. He recalls all that Dr. Irvine (with whom he mentions the late Dr. Macaulay) has done over the years for the cause of first-aid and rescue work in mines, and he commends the book to all English-speaking mining communities. All concerned, the author, Dr. Irvine, the publishers, the S.A. Red Cross Society, and the printers, Messrs. Hortor & Co., are to be congratulated on the production, which should be on the bookshelf of every mining man. The work is a local production entirely, and is published at 5s. per copy. The first part is published separately at 3s. 6d.

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ENGINEERING SECTION.

The Vaal River Scheme, Rand Water Board.

By W. Ingham, M.Inst.C.E., M.I.Mech.E.]

Part I.

In 1886 the Rand was proclaimed as a goldfield, and in December, 1887, the late South African Republic granted Mr. (now Sir) James Sivewright "the right to lay pipes through the streets of Johannesburg in order to supply the inhabitants thereof with water," from a source which he had acquired on the farm Doornfontein. Among other conditions attaching to this concession, the grantee was obliged to form a company—subsequently known as the Johannesburg Waterworks Estate and Exploration Company, Ltd.—and to charge not more than £2 per 1,000 gallons for any water supplied to the public. In 1889 the Waterworks Company had available an estimated supply of about 750,000 gallons per day. To meet the increasing demand of the town and the suburbs which were beginning to spring up very rapidly, the supply was gradually increased until in 1893 862,000 gallons per day were available, although the consumption only averaged 400,000 gallons per day; in 1895 the yield was increased to 1,470,000 gallons per day, while the demand was 866,000 gallons per day. The area within the Board's limit of supply is 1,712 square miles, and the population within the area is about 550,000, of which about 250,000 are whites. The total capital expenditure on the Board's works up to date is about £4,050,000. According to the census return of 1896, the population of Johannesburg in that year was as follows:—

Europeans ..	51,000
Natives	45,000
Asiatics ..	6,000
Total ..	102,000

It may be interesting to note that according to the latest census return (1921), the population of Johannesburg is:—

Europeans .	150,509
Natives	116,569
Asiatics ...	5,367
Other Coloured	10,459
Total	282,904

In 1897 water rights over the farm Zuurbekom were acquired, and pumping from that source was commenced in the following year. From that year until the transfer of its undertakings to the Board, the company had no difficulty in meeting the requirements of the consumers within the limited area which it then served.

Prior to 1899, two other companies, namely, the Vierfontein Syndicate, Ltd., and the Braamfontein Company, Ltd., were formed for supplying water, the first-named to the mines and the latter to the District of Parktown. The Braamfontein Company had available about 100,000 gallons per day from the wells and boreholes at Sans Souci. The Vierfontein Syndicate carried out investigations at that time for water for mining purposes on the farms Vierfontein, Zwartkopjes, Olifantsvlei, and other properties in the Klip River Valley, and in August, 1899, the Syndicate commenced to pump water to the mines from Olifantsvlei, and by the end of that year it was estimated that a supply of about 3 million gallons per day from the dolomite was well in hand, although the actual quantity available was only about 500,000 gallons per day.

A Commission was appointed in 1901 just after the Boer War, and the terms of reference were as follows:—

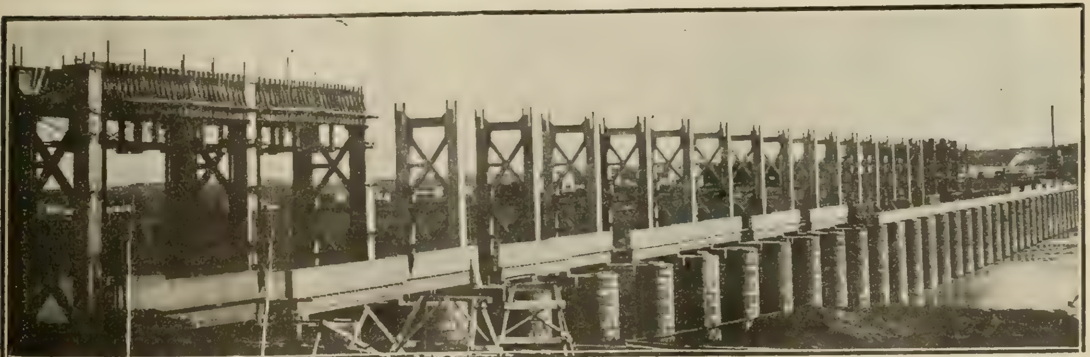
(a) To examine the available sources of water supply.

(b) To prepare a scheme for the creation of an unfailing water supply for the Rand and the mines, taking into consideration future requirements; and

(c) To consider the constitution of a public body for carrying out and controlling the said scheme.

As a result of this Commission the Rand Water Board was constituted by Ordinance No. 32 of 1903, and the Board was obliged to take over on the 31st March, 1905, the *whole* of the undertakings of the Johannesburg Waterworks Company, the Vierfontein Syndicate, and the Braamfontein Company.

An Arbitration Court was appointed in 1904, with the result that the Board had to pay £2,200,000 for the works in question.



Barrage Concrete Superstructure on the Vaal River.

Mr. Leitch, M.Inst.C.E., was the first chief engineer of the Board, and under his direction the Zwartkopjes source of supply was developed.

In November, 1910, Mr. W. Ingham, M.Inst.C.E., M.I.Mech.E., was appointed chief engineer, and the maximum available supplies were then about 8.9 million gallons, and the minimum about 4.9 million gallons per day. Under his direction the Zuurebkom sources were developed and the quantity from this area increased from 2.5 to 7.3 million gallons per day. In addition, temporary water supplies from certain mines on the East Rand were also obtained.

Owing to the increasing demand for water, the Board instructed the Chief Engineer, in 1911, to proceed with investigations for further supplies.

As a result of the Chief Engineer's investigations into all probable sources of supply *within a radius of fifty miles of Johannesburg*, he recommended the Board to adopt the Vaal River scheme. In 1913 the Board decided to present a Bill to the Union Parliament for the right to impound in the Vaal River a quantity of water sufficient to provide for a supply of 20 million gallons per day. The Bill was passed in June, 1914, and is known as Act No. 18 of 1914.

This scheme was selected by the Board from 21 large schemes reported upon by the Chief Engineer, and the total cost of these schemes was about £25,300,000.

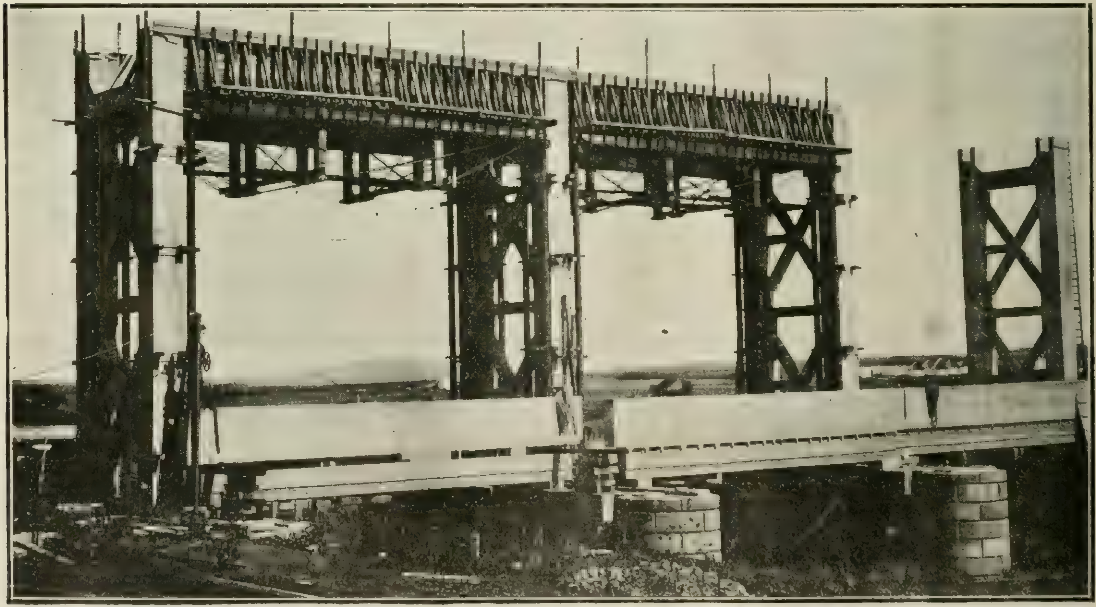
The impounding reservoir is being constructed to contain 13,633,000,000 gallons of water, and after allowing for all losses due to evaporation and absorption and for water below the point of abstraction and also deducting 1,800 million gallons impounded and reserved for riparian owners, there is 7,500 million gallons available for pumping to the Rand. This quantity gives 20 million gallons per day for one year if no water enters the reservoir. The barrage is being constructed about 25 miles down stream of the Vereeniging railway bridge. The length of reservoir is nearly 40 miles. The point of abstraction is about 1½ miles below the railway bridge at Vereeniging, where a river intake and pumping station has been constructed. Vertical spindle centrifugal pumps, driven electrically from main station, raises the water under a head of 80 feet through a 33 in. diameter pipe line to the main pumping station, where the water will be treated with sulphate of ammonia and allowed to pass through sedimentation tanks and then through "rapid mechanical filters." This method of purification is necessary owing to the finely divided silt which the water of the Vaal River contains. The silt contents ranges from 100 to 1,050 parts per million by weight. After passing the filters the water will be sterilised by electrically produced chlorine from common salt. From the main pumping station steam turbo-centrifugal pumps will raise the water to the Zwartkopjes Pumping Station, under a head of about 500 feet through a composite 22 in. and 24 in. diameter pipe line 26.3 miles in length. From Zwartkopjes the water will be pumped to the Forest Hill Reservoir (capacity 5 million gallons) under a head of 1,100 feet, and to the Leeuwpoort Reservoir under a head of 960 feet. A pipe line will be laid between the Zwartkopjes Pumping Station and Leeuwport Reservoir, and this will be composed of 18 in., 21 in. and 24 in. diameter pipes 16.9 miles in length. The new pumping units which are being installed at Zwartkopjes are steam turbo-driven centrifugal pumps capable of raising 5.5 million gallons against a head of 1,100 feet.

The following work has already been completed:—Reservoir at Benoni, capacity 2½ million gallons, cost £8,760. Reservoir at Signal Hill, Germiston, capacity 2½ million gallons, cost £10,196. Pipe line to Benoni Reservoir, 12 in. diameter and 12,000 ft. long, cost £10,657. Pipe line from Signal Hill to Simmer and Jack Reservoirs, 12 in. diameter and 4,000 ft. long, cost £3,798. Pipe line from Village Main Reef Pumping Station to Signal Hill Reservoir. This is a composite line of 18 in., 24 in., 26 in., 27 in. and 29 in. pipe and 35,500 ft. long, cost £79,179.

Reservoirs under Construction.

One at Zwartkopjes Pumping Station, one at Forest Hill and one at Vereeniging, each having a capacity of 5 million gallons. The accepted tender prices are:—Zwartkopjes, £15,257, reinforced concrete walls; Forest Hill, £13,113, mass concrete walls; Vereeniging, £11,587, reinforced concrete walls. The estimated cost of the Vaal River scheme *for engineering only* is £1,580,436, but the cost of the scheme after allowing for all charges will be about £1,750,000. The total capital expenditure after the new scheme is completed will be £5,150,000. The estimated cost of the barrage alone is £382,000. The scheme now under construction is for a first instalment of 5 million gallons per day.

The purpose of this paper is, however, to describe more particularly the construction of the barrage.



The Barrage Superstructure: A Closer View.

After an exhaustive survey of the bed of the river for a length of 130 miles, the site where the barrage is now being constructed was chosen because there was a good solid rock bottom, and the fall of the river was such that the necessary quantity of water could be impounded with a depth of only 25 feet at the barrage. It may be mentioned that the fall of the river bed between the barrage and the River Pumping Station is only 8 ft. in a length of 23½ miles.

The pumping station is being constructed at Vereeniging owing to the proximity of the railway and coalfields and also to save a large sum of money in connection with the laying of a pipe line from the barrage.

The rock at the barrage site is an outcrop of Amygdaloidal-Andesite or Diabase, which is very hard, dense and brittle, and weighs about 142 lbs. per cubic foot. The weight of the concrete is about 138 lbs. per cubic foot.

The barrage consists of a series of steel gates installed between concrete piers. There are 35 piers and 2 abutments, each 8 ft. thick, 55 ft. long and 34 ft. 6 ins. high. There are 36 steel gates, each 25 ft. high, the clear opening being 30 ft., the gates are 32 ft. 6½ ins. wide, being let into the piers for a distance of 15 ins. The weight of each gate is 26 tons, but with the balance weight, operating gear and other appurtenances the total weight for each opening is about 100 tons. The pressure on each gate is roughly 300 tons when the reservoir is full.

The gates will be fully raised during flood periods of high flood so that the flow of the river will not be obstructed and the reservoir will be kept free from silt. The average velocity during high flood is about 9 ft. per second. When the gates are raised to their highest position there will be a clearance of 7.4 feet above the highest known flood level, which was 26 ft. 6 ins. deep at the site of the barrage in November, 1917, and the calculated discharge at that time was 183,000 cubic feet per second.

To enable the gates to be lifted, which with appurtenances weigh about 29 tons each, the gate is counter-balanced with a weight just over double that of the gate, and it will be observed that the travel of the counter-balance is only one-half that of the gate. On the top of the piers a superstructure consisting of a reinforced concrete platform supported by reinforced concrete trestle columns is being built. The gates and counter-balances are suspended from this platform and the operating gear for the gate is also worked from this level. The height of the platform from river bed level is 71 feet and the total height from the bottom of the foundations is about 82 feet. To open a gate it will only be necessary to withdraw a clutch when the counter-balance will raise the gate to within 2 feet of the full lift. The operating gear is arranged with a flywheel which will damp the speed of the gates, and in addition a special cam fixed on the winding drums acts as an automatic brake at the end of the upward travel. The gate will be lifted for the last 2 feet of its height by means of worm gearing operated by hand. The gate will also be closed by hand by the worm gearing. The time taken to open each gate will be about 3 minutes and to close it about 20 minutes. The gate could be raised in one minute, but it is undesirable to raise a gate too quickly owing to the high velocity and quantity having a tendency to erode the apron.

The Union Government has availed itself of the opportunity of constructing a road bridge on the downstream side of the piers, and the Board have undertaken to construct it at cost price plus 10 per cent. The cost of this bridge will be about £22,250. The work may be divided as follows:—

(a) Excavation into the banks of the river to increase the waterway.

(b) Concrete apron 4 feet thick, 100 feet wide and 1,376 feet in length.

(c) Concrete piers 34 feet 6 inches high, 8 feet thick and 55 feet long.

(d) Reinforced concrete low level bridge for Golliath crane track and footwall. This crane is for handling the steel gates, which weigh about 29 tons with accessories.

(e) Thirty-seven reinforced concrete trestle columns to carry thirty-six spans of high level bridge.

(f) Thirty-six reinforced concrete balance boxes, 32 feet long by 4 feet 6 inches wide and 8 feet high, having a total weight of about 62 tons each.

(g) Thirty-six steel gates, each 32 feet 6 inches wide by 25 feet high, together with all the accessories.

(h) Reinforced concrete road bridge 1,400 feet long and 36 feet above the level of the apron.

Excavations.

About 275,000 cubic yards have been excavated in rock, shale, clay and earth. The object of cutting into the banks of the river was to increase the waterway to compensate for the area taken up by the concrete piers, so that there shall be no question of the piers obstructing the natural flow of the river in flood time. The additional waterway thus created is about 40 per cent. greater than the original area.

The Rock Excavation was carried out by means of rock drills chiefly of the Flottman type, operated by compressed air (pressure 75 lbs. per square inch at compressor), and the earth on the O.F.S. bank was removed hydraulically. The plant required for the latter operation included a Sulzer centrifugal pump and a 250 h.p. steam engine. A Reynold's chain was used for driving the pump, and it worked in a very satisfactory manner.

Water was pumped from the river through a 15 in. main having three 8 in. branches. The ends of the 8 in. branches were provided with monitors having 1⅛ in. and 1¾ in. nozzles and the water pressure was maintained at about 80 lbs. per square inch at the jet. The centrifugal pump was capable of supplying 2,100 gallons per minute. This method was found to be cheap and expeditious for removing the earth and soft clay.

The rock at the barrage site is continuous across the river and no difficulties were encountered with the foundations. In blasting the rock in the river bed only shallow holes were put down, the bottom of which were never less than 9 inches above the finished level. This depth (18 inches) was most suitable for this class of rock, and it was found that by using small charges that the rock was not shattered.

(To be continued.)

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SOUTH AFRICAN STUDENTS IN BRITISH TECHNICAL COLLEGES.

The British Trade Commissioners in South Africa have recently been considering the question of attracting young South Africans to British engineering and other technical colleges and training establishments in the United Kingdom, and in this connection Major Guy Fetherston, Trade Commissioner at Capetown, has received from Professor McMillan, of the Capetown University, some remarks on the commercial advantages of the system, from which the following notes are extracted:—

"It is known that the United States are most anxious to attract students, and especially post-graduate students, to its universities. No better method of increasing trade between the two countries exists. The South African goes to America as a student, he works with American machinery, and becomes acquainted with American methods and American standards, and he forms friendships there which probably last throughout his life. In due course the ex-student returns to South Africa to embark on a business career still thinking in American measures, and even if he is inclined to deal in the products of other countries, in nine cases out of ten the American products remain as his standard for comparison of all other goods.

"It is, of course, known that large numbers of young South Africans proceed to England to complete their education, even more than go to America, but the greater proportion of them go to study medicine and law or else to take a course for Bachelor of Arts at Oxford or Cambridge. America appears to be attracting the bulk of the agricultural students, the engineers and the science men. The case of Germany before the War is interesting in this connection. Germany attracted the post-graduate student from all over the world, and there would appear to be little doubt that America is eventually to take her place unless Great Britain makes greater efforts than in the past.

It is, of course, understood that British universities are very full, and that there would be difficulty in accommodating more students from overseas. However, it would pay in the long run to attract overseas students, even if further accommodation had to be provided. It is felt strongly that the manufacturers of the United Kingdom should do everything in their power to attract the future leaders of colonial industries to the British research laboratories, and even if they had to offer a number of maintenance scholarships to attain that object there could be no better capital investment for the future.

"Then there is the question of the equipment of the universities and technical schools in South Africa. While a proportion of graduates proceed to America or to Europe for their practical training after their college course, a still greater number is absorbed direct from college into business. It is therefore in the interests of the United Kingdom that such men should handle British apparatus in the laboratories during their training, and every effort should be made by the representatives of the manufacturers to see that the testing plant and equipment is British. Before the War if a British firm and a German firm were asked to quote for some piece of apparatus or machinery for use in a university the German firm generally offered to supply it for less than the British firm, no matter how low the British tender was."

In connection with the above, it may be stated that the American Consul-General in Capetown has recently given publicity to the fact that he has literature dealing with over one hundred American universities, agricultural, engineering and other technical colleges, which may be consulted at the American Consulate-General. Information concerning entrance requirements, cost of tuition, cost of living, and the general opportunities for South African students existing at State and other institutions is offered. It is desirable that similar facilities with regard to British institutions should also be available not only at Capetown, but at other centres of population throughout the Empire. British educational institutions or firms supplying educational apparatus who are interested in the above statement, and who are prepared to supply information or apparatus, should communicate with the Department of Overseas Trade, referring to D.O.T. 5556/E.D.

* * * *

Pretoria has decided to instal a new and up-to-date lighting and power plant, costing upwards of £300,000. In accordance with the latest power station practice, a steam pressure of 350lbs. has been adopted, which will ensure very low fuel costs. The power plant will consist of three turbo-alternator units of 3,000 k.w. each, the order for which has been placed with the British General Electric Co., Ltd., of Johannesburg. The turbines will be built in their Fraser & Chalmers' engineering works at Erith, and the electric portion in the G.E.C. works at Witton. The boiler plant order has been secured by Messrs. Reunert & Lenz for Babcock and Wilcox boilers. Thus British factories, despite keen competition, have been successful in securing this order.

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THE ENGINEERS' CLUB IN LONDON.

(*From our Special London Correspondent*.)

Some short time ago engineers in Great Britain realised that there was no Engineers' Club in London, the city especially famous for its clubs and, above all, the capital of the Empire. It has not taken long, however, for this unaccountable defect to be remedied and, following the work of a provisional committee, the club was formally constituted at an enthusiastic meeting of over 750 members who had designed the preliminary application form, assembled on Thursday last (June 2nd) at 2.30, in the banqueting hall at the Hotel Cecil, Strand, W.C. Mr. Wordingham was in the chair, and the temporary hon. secretary, Mr. Edmund L. Hill, gave an account of the work of the provisional committee. There are already about 900 London members, 600 country members, and 200 overseas members.

Applications are pouring in at the rate of 150 a week, and there is no doubt that by the time suitable premises are ready and the club actually in operation the membership will be three to four thousand. Negotiations have been in progress for some time with regard to premises, and there is every prospect that the club will be opened early in the summer. The Engineers' Club will be one of the best in London, and the idea is to cater specially for the social side and for the country and overseas members. Probably 100 bedrooms will be included in the premises, and it is hoped to make the club the rendezvous for British engineers visiting London from all over the world.

There is said to be at least 1,000 oversea potential members in London on any one day in the year, so that the value and benefit of the club will be obvious, and it is to be hoped that every engineer abroad will join. The subscription is most reasonable, 2 guineas per annum for overseas members, with 10 guineas for London members and 5 guineas for country members, and full particulars, together with application forms, can be obtained from the temporary hon. secretary, Mr. E. L. Hill, 39, St. James's Street, London, S.W.1.

The qualifications for admission are on broad lines, and include not only engineers, using the word in the sense of mining, metallurgical, mechanical, electrical, civil and chemical engineering, but also those who are interested in engineering and in the opinion of the Council eligible for membership.

Progress at Newcastle Iron and Steel Works.

The history of the Newcastle Iron and Steel Works has been reviewed from time to time in these columns, and it is not necessary to recount here the story of the origin of the company's early struggles. The works are now in a forward state, and the latest account of them is contained in the following extract from a Durban contemporary:

The work of erecting the substantial buildings and installing the massive plant has necessarily been slow, but a glance over the works on Tuesday of last week revealed that Mr. J. K. Eaton, the enthusiastic managing director, and his staff of engineers have not wasted any time. Mr Eaton, by the way, is the promotor of the company, and as he is one of the pioneers of the iron and steel industry in South Africa, he should know what he is doing. First, it should be explained that the company's property is about 200 acres in extent and the buildings and furnaces cover an area of about 10 acres. Since the original scheme it has been decided to increase the capacity of the plant, and this necessitated further capital

When it is stated that 35,000 checker bricks are put into one stove, and that 140,000 bricks have been used monthly on the various buildings, it will be realised that the supply of bricks was an important factor. Fortunately the clay taken from the foundations and from an adjoining pit proved suitable for ordinary bricks, while raw material from an adjoining mine proved ideal for fire bricks. Kilns and drying sheds were built, and the company has been manufacturing all the bricks required for its own building

An interesting building is the engine room, on top of which a concrete tank of 50,000 gallon capacity is to be built. Installed in the engine room are two huge blowing engines, each of 800h.p., which blow wind into the furnace. The foundations for these engines, which weigh about 200 tons each, are massive blocks about 20 feet deep. Alongside the engine room is the smoke stack, which is 150 feet high; three boilers of 750h.p.; and two massive stoves, which will pre-heat the air for the furnace. These stoves are 80 feet by 10 feet. Then there is the furnace, a substantially built tower 70 feet high, which will, when in operation, hold a column of material 60 feet high. Ore bins are nearly completed, while the work is well advanced on the series of coke ovens, which will convert the coal into coke. In this connection it might be mentioned that the company is drawing coal from the Ballengeich Coal Mine, but has its own colliery two miles from the works.

In untechnical language, the manufacturing process for pig iron is as follows: The raw materials—iron ore, coke, and limestone—are brought up in bins and hauled to the top of the furnace by a special elevator. The material is tipped into the furnace, which has special linings and ducts of fire bricks, bound by stout iron bands. The raw material works down until it becomes red hot. The limestone searches out the impurities, which are tapped out as slag, while the molten iron is also tapped out and runs into moulds for cooling. The process is continuous, and the furnace will work day and night.

The company has an option on five farms for quarrying iron ore, and it is anticipated that there will be an inexhaustible supply. It is estimated that one farm alone has sufficient ore to keep the furnace busy for 40 years.

The foundry is contained in a series of bays 180 feet by 92 feet, with an overhead electric crane (20 tons), and is capable of turning out the heaviest castings. The European quarters and laboratory are situated abut 200 yards from the works, while on the other side native quarters have been erected. The company generates its own power for electric lighting, etc.

While early for congratulations, it might be mentioned that Mr. Eaton and his staff have had to surmount many difficulties and labour troubles, and the progress which has been made on the buildings is a notable achievement.

* * *

The American Engineering Standards Committee (29 West 39th Street, New York) reports that progress has been made in the unification of the more important standards and in overcoming the confusion that was being produced by the numerous organisations (more than 100) which hitherto published engineering standards without systematic co-operation among themselves. The Committee is now composed of 47 members, representing 17 bodies or groups of bodies, including six National engineering societies, five Government departments, and 13 National industrial associations. Its function is merely to see that each body or group concerned in a standard shall have opportunity to participate in its formulation, which is in the hands of a working committee, technically called a Sectional Committee. Each Sectional Committee is organised by, and under the leadership of, one or more of the principal bodies interested, such bodies being known as sponsors. An important part of the committee's work relates to safety codes. Active work is now in progress on 24 such codes with hearty co-operation among the State Commissions, associations of insurance companies, National engineering societies, manufacturers' and industrial associations, labour and civic organisations, and technical bureaux of the Federal Government. There are now national standardising bodies in Australia, Belgium, Canada, France, Germany, Great Britain, Holland, Italy, Sweden, and Switzerland. The Committee is in touch with all of these, and is actively co-operating with several of them. A national standardising body is being formed in Japan. It is planned that the office shall serve as a Bureau of Information on engineering standardisation, keeping in touch with all that is going on in connection with standardisation both in America and abriad, so that full and reliable information on any subject in connection with standardisation work may be promptly given.

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The Week in the Sharemarket.

GOLD SHARES FIRM—A DIAMOND REVIVAL—BETTER OUTLOOK.

The tone of the whole market has been firmer this week on better advices from London and the good June profits declared by the gold mines. Two other favourable factors are the likelihood of the Chamber of Mines and the men coming to an early compromise in regard to the wages cut, and the better outlook in the diamond sharemarket. The cause of this last is put down to renewed French buying, and quotations of many diamond shares are now at such temptingly low levels that any favourable news quickly affects them. The negotiations regarding wages on the Rand remain unfinished at the time of writing, but it is hoped a step towards settlement has been taken by the parties concerned. The gold premium remains steady at about 110s., and has been conservatively estimated at £5 7s. 6d. by most of the mines in computing the June profits. The De Beers-cum-Central Mining backing to the Cape Explosives issue made the over-subscription a foregone conclusion, and is a bull factor for all concerned. The speech made by Sir Lionel Philips at the Central Mining meeting has also produced a good effect, and, on the whole, it may be that things are about to take a turn for the better. It will be seen from the week's quotations below that prices are firmer all round, with notable rises in some specialities.

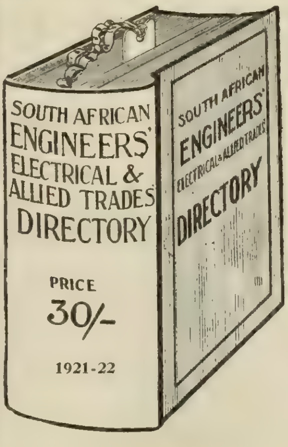
	Fri 1st.	Sat. 2nd.	Mon 4th.	Tues. 5th.	Wed. 6th.	Thur. 7th.
Anglo Amer. Corp.	16 3*	16 9*	16 9*	17 6	17 9*	18 6*
Apex Mines	7 0*					
Aurora Wests						1 0
Bantjes Cons.		4 11*	5 0	5 0*	5 0	5 0*
Brakpan Mines						54 6†
Brick and Potteries	-	4 6	4 0*	4 0*	4 0*	4 0*
Bushveld Tins	0 7½	0 6*	0 7*	0 6*	0 8*	0 11†
City Deeps				42 0*	43 0*	43 0
Clydesdale Colls.	26 0*		-		-	26 0b
Clydesdale Colls.	26 0*	-			-	26 0b
Con. Diamonds	11 0*	11 3	11 0*	11 6	13 0	13 0
Con. Investments	20 0*					
Con. Langlaagtes	10 6*				10 6*	
Con. Main Reefs	8 6	8 9*	9 3*	9 0*	9 0*	9 3*
Con. Mines Selection			11 0*			
Coronation Colls.	45 0					
Do. Freeholds	0 9	0 9*	0 9*	0 10*	0 10*	1 0
Do. Syndicates	6 6*	6 6*	6 9	7 0	7 0*	7 3*
Crown Diamonds	2 6	2 6*	2 7*	2 6	2 7*	2 7*
Crown Mines	35 0†	-				
Daggafontein Mines	3 4	3 6	3 4*	3 3*	3 0*	3 3
E.R. Coals	2 4*	2 3*	2 3*	2 6†	2 5†	2 4*
E.R. Deeps	0 6*	0 6*	0 6*	0 6*	0 6*	0 6
E.R. Minings	7 6*	7 6*	7 6*	7 6*	7 6*	7 6*
E.R. Props.	4 6*	4 7*	4 6*	4 6*	4 6½	4 6*
E.R. Debentures		£67½*	£67½*	£67½*	£67½*	£67½
Eastern Golds	0 6*	0 6*	0 6*	0 7		
Frank Smith Dmds.	2 7*	2 6	2 7*	2 8*	2 8*	2 8
Geduld Props.	47 6*	47 9*		49 6	49 9	
Glencoe Colls.	14 6	14 9*	14 9*		14 9	14 10*
Glynn's Lydenburgs.	8 6†	9 0†	9 0†	9 0†	9 6	
Govt. Areas	75 3*	75 9*	76 0	75 0*	75 6*	75 6*
Knight Centrals	4 0*	4 0*	4 0*	3 11	3 11*	3 10*
Lace Props.	7 0	7 0	7 3†		7 3†	7 0
Leeuwpoort Tins	9 6*	9 6		9 3*	10 0†	9 0*
Lydenburg Farms.	5 9*	5 9*	5 6*	5 6	5 9*	5 9*
Middelvlei Est.	2 0†					
Modder B.'s	24 3	24 3*	24 9	26 0	25 6	26 0*
Modder Deeps	41 6	41 6	41 6	41 9	41 6	40 4
Modder Easts	10 3	10 0a	10 0*	10 2	10 3	
Hume Pipes	17 0*					
Natal Navig. Colls.	35 0*	35 9*		36 0		36 0
New Eland Diamonds		20 0†	20 0†	20 0†	17 6*	
New Era Cons.	6 6	6 9		6 6*	6 6*	7 0
New Geduld Deeps	1 4		1 4	1 4*	1 4*	1 1
New Kleinfonteins	5 6†		5 6			
New Modders.	62 6*	63 0	62 9	63 6	63 0*	64 0
New Unifieds	4 0*					
Nigels	4 0*		4 0*		4 0*	
Nourse Mines	-		7 6†			
Pretoria Cements	47 3*	47 0		46 6*	47 7*	
Princess Estates	1 1†		0 10*	0 10½	0 10	1 0*
Rand Nucleus	1 0*		1 0*			
Randfontein Centrals					8 3*	8 6*
Do. Estates		13 3	13 3*	13 3*	13 6*	14 6
Roberts Victors	-				6 0*	7 3*

	Fri. 1st.	Sat. 2nd.	Mon. 4th.	Tues. 5th.	Wed. 6th.	Thur. 7th.
S.A. Breweries				28 0†	28 0†	28 0†
S.A. Lands	4 0*	4 3†	4 1½	4 1	4 0*	4 1*
Springs Mines	34 0*	35 3	35 9	35 9*	36 0	36 6
Sub Nigels	11 0*	11 6†	11 0*	11 3	11 0*	11 0*
Swaziland Tins	-		12 0†	--		-
Transvaal Lands	-			17 3b		..
Trans. G.M. Est.	8 0†				7 6*	7 6*
Van Ryn Deeps	65 0*	65 0*	65 9	65 9*	66 3*	66 9
Village Deeps			6 6*			6 6*
West Rand Cons.		2 0*	2 0*	2 0*	--	2 0*
Witbank Colls.	45 0*				44 0*	45 0*
Western Rand Est.	3 9*	3 9*	3 6*	3 6	3 9*	4 0
Witwatersrands		10 9†	10 6*	10 9*	10 9*	10 9*
Wit. Deeps	6 6*	7 6†	6 9	6 9*		7 0
Wolhuters	3 4*	3 4*	3 4*	3 4*	3 3*	3 4*
Zaaiplaats Tins	3 0*	3 1*	3 1*	3 2*	3 2	3 1
Union 5 per cent.	£97½*	£97¼	£97¾	£97⅝†	£98	£97⅝*
New States		22 6*	22 6*	23 0*	23 0*	23 0*
Rouxvilles	1 3*	1 0	1 3*	1 3*	1 3*	1 0*
S.A. Townships	10 6*	10 6*	10 6*	10 6*	10 6*	11 0†
S.A. Alkila	15 6*	14 9*	15 9	16 0*	17 1	17 6
Transvaal Silvers	24 9*	25 0*	25 0*	25 0*	25 9	26 3*
West Springs	10 3*	10 3*	10 3*	10 6*	-	11 3*
South Van Ryns	-		2 0*	2 0*		2 6*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Concerning Mines and Men.

After twenty-eight years' service, Mr. J. F. Rutherford retired last week from the firm of Barnato Bros. At a farewell presentation, Prof. Lawn, upon behalf of the staff of Barnato Bros. and the "J.C.I.," handed Mr. Rutherford a substantial cheque, with which they hoped he would purchase a sailing boat. Sailing is Mr. Rutherford's recreation, and Prof. Lawn hoped that the recipient would long be spared to indulge in his favourite hobby. Mr. Rutherford is going on a trip to India before settling down on the Natal coast.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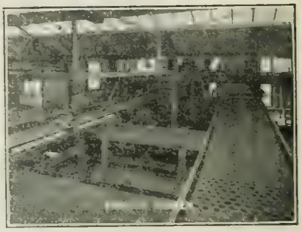

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RHODESIAN SECTION.

Rhodesia's Mineral Output.

DETAILS OF PRODUCTION FOR MAY—TOTAL VALUE £350,737—RHODESIA'S OUTPUT TO DATE, £58,387,118.

The Report of the Executive Committee of the Rhodesia Chamber of Mines on the output of gold and other metals and minerals for the month of May, 1921, states:—The following is a summary of the returns of Native labourers employed on Southern Rhodesian mines during the month of March and April, 1921:—

	March.	April.
Local	8,096	8,371
Portuguese Territory	4,884	4,820
Northern Rhodesia	10,919	10,944
Nyasaland	14,081	14,305
Other Sources	708	647
	38,688	39,087

The number employed in April shows an increase of 3,811 as compared with the corresponding month in 1920.

The total value of the gold and other minerals from Southern Rhodesia for the month of May, 1921, amounted ot £350,737 as compared with £428,913 for the previous month of April.

The returns of gold and the mineral output are as follows, in detail:—

GOLD.

MATABELELAND.

Bulawayo District:—

	No. of Stamps.	Tons Treated.	Yield. Ozs.	Value. £
Abercorn (Abercorn G.M. Co., Ltd.)	5	556	421·45	1,770
Do. Sands	—	240	60·42	254
Addie Iris (H. A. D. Tansley)	2	93	83·52	351
Adit, H. L. Stewart	3	150	36·37	153
Antelope (H. Herrington)	5 2P	932	292·34	1,228
Do. Concentrates	F	—	50·37	212
Athi (Berry and Black)	5	234	81·92	344
Baupaume (A. W. Wilson) (sands)	—	400	68·55	288
Big Ben (W. E. Hunt)	2	140	44·49	187
Bill's Luck (Bill's Luck Syndicate)	5	600	110·45	464
Do. Sands	—	345	12·49	52
Camp (Carson Mines, Ltd.)	5 1P	830	143·58	603
Do. Sands	—	480	48·10	202
Fanora (A. Granger)	5	270	78·45	330
Fred & Fred, 1 W (Trans. & R. Est.)	10 4 P	1,600	905·46	3,803
Do. Sands	—	354	12·49	52
Freda (Coghlan & Black)	3	412	29·48	124
Golden Vein (L. Granger)	3	50	19·60	82
Helen & Fiery Cross (Koodoo Synd. No. 2)	5	440	143·17	601
Horn (Horn Reef Syndicate)	10	577	86·90	365
Huntsman (Rhodesia G.M. and Investment Co., Ltd.)	5	245	89·53	376
Do. Slimes	--	588	120·04	501
Iris (A. J. Ledingham)	3	179	23·19	97
Jessie (Jessie Tributors)	15 4P	1,970	430·14	1,807
Do. Sands	—	2,390	188·22	791
Jumpers (E. A. Bills), slimes	—	265	35·89	151
Killarney (F. D. Roscoe)	10	533	150·68	633
Do. Sands	—	345	39·44	165
Do. Slags	F	—	27·84	117
Legion (W. H. Robinson)	5	305	76·73	322
Lonely Reef G.M. Co., Ltd.	20 3T	5,440	2,125·53	8,996
Do. Slimes	—	5,440	3,252·21	13,828
Mortlake (J. Frisby)	Dolly	2	4·31	18
New Eclipse (J. R. Stewart)	5 1T	1,048	443·49	1,863
Do. Sands	—	690	71·68	301
Night Shift (E. Warren)	5	300	63·94	269
Old Nic (Old Nic Slimes, Ltd.), slimes	—	1,914	89·42	375
Queen's (Bembesi Dis. G.M., Ltd.)	10	220	106·09	446
Do. Slimes	—	180	10·98	46
Red Boy (Est. H. Lunnun, deceased)	5	123	54·05	227
Do. Sands		184	21·14	89
Red Rose (Rewi Byi. Dev. Synd.)	10	450	155·37	652
Scoveni (W. H. & D. A. Burrows)	3	60	33·65	141
Sybil & Mabel (M. Sedgwick), Feb.	2	10	2·93	12
Do. April	—	11	5·45	22
Do. May	—	8	3·88	16
Valley o' the Moon (Cameron & Price)	5	250	21·78	91
Premiums—Nov., 1920—Jan., 1921		—	—	1,888
Bulawayo District total			10,720·27	47,104

Asbestos Production in Rhodesia. The Mill at the Nil Desperandum Mine.

Gwelo District:—

	No. of Stamps.	Tons Treated.	Yield. Ozs.	Value. £
B. F. (B. Bertoldi) ..	5	675	160·17	673
Babs (Beach & Boby)	5	644	152·42	640
Do. Sands...	–	122	23·11	97
Bertha B. (H. H. Field), February	3	322	34·76	146
Black Prince (S. Levin), February ..	5	450	148·50	624
Common Cause (H. W. Gray)	3	375	80·46	338
Commonage (H. W. Gray)	1 T	454	42·28	178
Connemara (Connemara Syndicate) ...	RP	520	459·81	1,931
Do. Sands...	—	1,612		
Csardas (Wortshall Syn.), final clean up	—	—	134·08	563
Danga (Cribb & Seear)	5 1 P	574	119·52	502
Do. Sands...	—	—	31·92	134
Divide (J. Jones)	5	400	87·11	366
Eva (Swanepool & Stocks), April ...	5	43	17·94	75
Do. May	—	39	10·33	43
Falcon Mines, Ltd., with adjustment (Copper, £16,209; Silver, £150.)	28 N 2T	15,637	3,144·18	13,206
Gaika G.M. Co., Ltd.	5 1C 1T	3,324	861·06	3,651
Do. Sands...	—	3,956	420·86	1,784
Glen Hume (Glen Hume Synd.)	5 1 P	900	96·45	405
Globe & Phoenix G.M. Co., Ltd. ...	40 12P	6,364	4,155·67	17,454
Do. Slimes	—	4,855	913·46	3,837
Helvetia (J. Wyser), April	2	80	9·43	40
Makokooshla (R. Sharkey)	5	200	64/40	270
Mary Fraser (J. Thornett), February	H	150	21·53	90
Moss (James & Worthington)	5	802	406·12	1,706
Old Dunraven (J. Cruikshank), contration	—	—	13·37	56
Pod (H. K. Havnar)	2	116	168·25	706
Primrose (J. M. Harris)	5	864	81·39	342
Do. Sands...	—	1,120	41·26	173
Riveriea (G. C. Hooper), sands	—	623	73·01	307
Do. Slimes	—	340		
Royalist (J. Austen), sands, February	—	614	106·17	446
Do. May	—	648	65·34	274
Second Trial (J. Rainsford), clean up, April	—	—	1·12	5
Smith's Pocket (C. A. Abbott)	5	368	38·26	161
Strike (F. G. Shaw)	H	400	57·19	240
Veracity (L. R. Evans)	5	600	143·72	603
Do. Sands...	—	650	80·64	339
Verdun (A. Malcolm), sands	—	400	33·47	141
Woodend (Woodend G.M.), April ...	5	401	59·23	249
Do. May	—	383	91·99	386
Zabonkwe (W. Holmes), April	5	805	107·39	451
Do. Sands, April	--	560		
Do. Slimes, April .	--	245		
Do. May	—	800	98·40	413
Do. Sands, May	—	580		
Do. Slimes, May	—	220		
Gwelo District Total			12,855·77	54,045

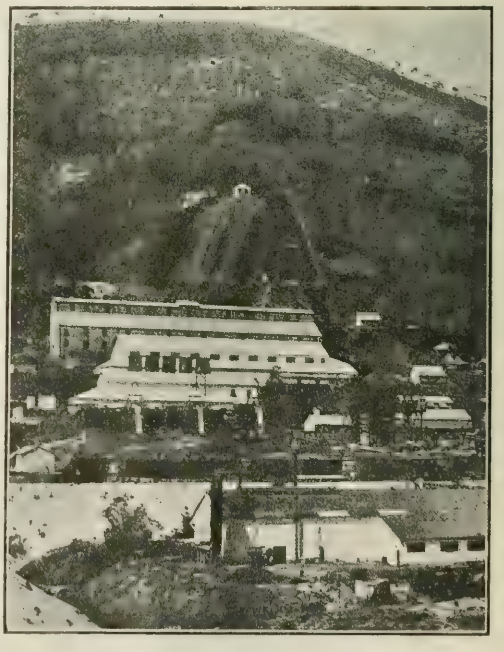
MASHONALAND.

Hartley District:—

	No. of Stamps.	Tons Treated.	Yield. Ozs.	Value. £
Ambassador (J. G. Volk)	5	350	59·08	248
Do Sands	–	400	38·10	160
Aurora (Aurora Syndicate)	5	209	69·35	291
Big Bounder (Pope & Baker)	5	540	185·70	780
Cam & Motor G.M. Co., Ltd.	RP 4 BM	11,200	611·00	2,091
Do. Concentrates	—	1,330	2,450·04	10,388
Cissy (J. E. F. Poulton), April	2	70	17·97	76
Do. Sands ...	-	120	7·50	31
Do. May . . .	—	82	23·12	97
Do. Sands	—	140	9·62	40
Colne (H. F. Wilson)	5	166	20·89	83
Do. Sands...	—	100	19·46	81
Cricket (F. C. Luxat) ..	H	520	132·24	556
Do. Sands...	—	400	64·61	271
Do. Concentrates .	F	—	41·15	173
Eileen Alannah Mining Co., Ltd.	6 N	2,200	141·81	596
Do. Sands	—	1,247	111·55	468
Fearless (E. Jessop), April	3	235	25·39	107
Freda (W. H. Snell), April, sands	—	400	45·51	191
Do. Final clean up	--	—	5·24	22
Glendarra W. Ext. (C. S. Marks)	2	190	8·51	36
Glenorchy Ext. (R. A. Smith)	5	221	56·43	237
Golden Valley (John Mack & Co.)	10 1P	1,065	293·07	1,231
Do. Sands...	-	561	256·18	1,076
Do. Slimes		635		
Grandeur (Grandeur G.M. Co.) . .	5	673	42·38	178
Do. Sands	-	450	13·98	58
Hepworth No. 2 (J. W. Banner)	5	423	80·22	337
Do. Sands...	-	214	13·34	56
Hero 2 (R. A. Smith) .. .	5	376	36·57	153
Do. Sands	--	400	26·41	111
Hollis (Dumnonian Syndicate) .	5	270	37·01	158
Hope (Hope Syndicate)	5	670	70·12	294
Do. Sands	—	540	19·42	82
Horseshoe (J. D. McCullum)	5	760	62·31	264
Inkerman (I. J. Minaar)...	5	360	91·12	382
Do. Sands	—	248	16·64	70
Jackie's Luck (Mrs. Sarah Smith)	2	20	9·24	39
Kanyemba (J. W. Banner)...	10	610	235·29	988
Do. Sands...	—	460	39·09	164
Linden (J. Davidson)	3	70	15·57	65
Mali (J. Thornett), sands	—	1,060	22·01	92
New Invincible (I. J. Minaar), slimes	—	345	58·45	246
Newington 2 (J. M. Kerr), sands ...	—	210	48·02	202
Nut (J. Aronowitz)	5	520	69·12	290
Do. Sands...	—	450	19·62	82
One Step (W. Miller), April	2	170	46·68	192
Do. May	—	130	34·78	146
Owl (A. Rolfe)	10	755	141·06	592
Do. Sands...	—	725	97·58	410
Do. Slimes...	—	156		
Oxo & Radiant (Trixie, Ltd.)	5	369	67·76	285
Pickstone 1 W (Pickstone G.M., Ltd. (in liquidation), slags	F	—	198·73	835
Shepherds (Begbie & Jackson)	10 1T	728	116·06	488
Do. Sands...	—	635	87·45	367
Do. Slimes	—	300		
Trafalgar (J. Thornett)	5	346	73·91	310
Tssessebe 2 E. Ext. (Ullyett, Cribb & Seear)	10	1,552	410·43	1,7[illegible]
Do. Sands...	—	1,456	87·96	369
Do. Concentrates	F	—	30·36	128
Turkois (J. Mack & Co.)	10 2P	1,287	304·59	1,279
Do. Sands...	—	1,287	225·49	947
Washington (I. J. Minaar)	5	140	30·34	127
Do. Sands...	—	82	5·54	23
What Cheer (H. Moser)	10	504	109·11	458
Premiums. Nov., 1920—Jan., 1921 ...				16,094
Hartley District total			7,787·69	48,924

Lomagundi District:—

	No. of Stamps.	Tons Treated.	Yield. Ozs.	Value. £
Anglian (F. L. Standen)	5	97	28·62	120
Eldorado (Austen & Eaton)	5 1T	1,040	152·01	638
Jolly Boys 1 S.W. (Jolly Boys Synd.)	5	345	73·72	31[illegible]
Maggiemac (J. McMurdon)	10	780	185·03	77[illegible]
Do. Sands...	—	520	44·66	188
Noxid (C. H. Nixon), April	1	45	5·52	23
Do. May	—	60	7·10	30
Submarine (F. K. Brown)	5	284	30·76	129
Ventura (Ventura Syndicate)	5	-	22.33	94
Lomagundi District total			549·76	2,309



Rhodesia's Largest Gold Producer—" The Shamva."

	No. of Stamps.	Tons Treated.	Yield. Ozs.	Value. £
Mazoe District:—				
Darwin Bell (Rubock & Mutter) Pannings	—	—	3·80	16
Promoter 1 (F. C. Croxford) .. .	C	2,554	63·34	266
Do. Sands...	—	1,940	79·75	335
Slam (Slam Syndicate)	10	937	74·19	311
Mazoe District total			221·08	928
Salisbury District:—				
Alliance (Alliance Trib. Syndicate)	5	625	172·41	724
Arcturus Slate (Goldfields Rhodesia Development Co., Ltd.)	20 2C	5,820	1,139·97	4,836
Do. Sands...	—	5,820	1,802·37	7,645
Beatrice (New Beatrice G.M. Co., Ltd.), slimes	—	1,200	67·41	283
Bridge (D. H. Curry)	3	364	76·33	321
Do. Sands...	—	100	23·67	99
Downton (J. A. Moore)	5	493	192·07	807
Joking (W. C. Harrison)	8	330	375·99	1,579
Do. Sands...	—	170	38·29	161
Joyce (B. Ellsmoor), sands	—	480	75·51	317
Juno (Santa Claus Synd.), April	5	184	41·34	174
Do. Sands...	—	130	43·61	183
Do. May	—	220	51·63	217
New Full Back (W. B. Maris), April	2	20	6·55	27
New Umbrella (J. A. Moor)	2	185	24·40	102
Right Bower (G. Hawkins)	2	15	27·90	117
Shamva Mines, Ltd....	64N 12T	55,500	2,679·78	11,37[illegible]
Do. Sands...	—	30,554	5,436·02	23,049
Do. Slimes	—	23,581		
Tip Top (Jumbo G.M. Co., Ltd.)...	10	1,350	449·13	1,886
Do. Sands...	—	550	21·11	89
Top (Harrison & Rooke)	5	710	287·60	1,208
Trio (Trio Syndicate)	5	345	131·76	553
Do. Sands	—	278	24·52	10[illegible]
Other Sources:				
Scrapings Copper Plate	—	—	3·91	16
Salisbury District total...			13,193·28	55,869
Umtali District:—				
Kent (R.M.S. Syndicate)	10	1,000	302·49	1,271
Do. Sands...	—	800	49·41	208
Liverpool (Est. R. G. Snodgrass, dec.)	10	500	88·67	372
Do. Sands...	—	380	32·28	136
Rezende D.B. 1 (R.D. Syndicate)... ...	10	1,530	95·49	401
Do. sands...	—	450	33·18	13[illegible]
Rezende Mines, Ltd.	45	5,800	1,567·43	6,651
Do. Sands...	—	3 309	356·02	1,511
Do. Slimes	—	1,986	367·77	1,560
Do. Concentrates	—	167	338·95	1,438
Premiums				2,200
Umtali District total			3,231·69	15,887
Victoria District:—				
Empress (D. & J. Laing) .	C	1,550	98·92	415
Do. Sands...		800	85·56	359
Victoria District total . . .			184·48	774

(P) Grinding Pan; (BM) Ball Mill; (T) Tube Mill; (H) Huntington Mill; (RG) Gates Rolls; (B) Ball Mill; (Pn) Pneumatic Stamps; (N) Nissen Stamp; (C) Chilian Mill; (RP) Roasting Plant; (F) Treated at Falcon Mine; (WM) Waterfall Mill; (LM) Lane Mill; (EP) Experimental Plant.

ASBESTOS—MAY, 1921.

	Tons.	Value.		
Bulawayo District:—				
Birthday A. & B. (Willoughby's Con. Co., Ltd.)	306·45	£10,410	10	6
Nil Desperandum and Sphinx (African Asb. Mining Co., Ltd.)	424·25	10,606	5	0
Pangani (J. S. Hancock)	24·09	580	15	6
Serpentine (African Asebestos Mining Co., Ltd.)	14·77	369	5	0
Shabanie (R. & General Asb. Corp., Ltd.)	904·54	22,613	11	3
Slip " A " (Slip Syndicate)	20·00	1,200	0	0
Lomagundi District:—				
Ethel (Union & Rhodesian Trust, Ltd.) .	36·45	911	5	0
Victoria District:—				
Balmain (African Asb. Mining Co., Ltd.)..	100·00	2,500	0	0
Gath's (R. & General Asb. Corp., Ltd.)..	392·12	9,803	0	0
King Asbestos (Rhod.), Ltd.	117·00	2,005	10	0
Olga (R. Dures)	5·00	100	0	0
	2,344·67	£61,100	2	3

Summary of Mineral Production for the Month was as under:—

		Value.
Gold (fine ounces)	48,744·02	£225,841
Silver (fine ounces)	12,806·18	1,163
Coal (raised 44,688 tons) (sales)		15,107
Coal (used for Coke and Bricks)		6,363
Copper (Blister) (tons)	265·57	16,209
Chrome Ore (tons)	5,699·88	23,248
Asbestos (tons)	2,844·67	61,100
Arsenic (tons)...	8·20	301
Mica (5 tons 1,597 lbs.)...		31
Total		£350,737

N.B.—The above gold output includes £20,182 premiums on gold.

Grand Totals Gold and Other Metals and Minerals, and Precious Stones, Output to Date:—

		Value.
Gold (ounces)	11,930,958	£49,509,529
Silver (ounces)	3,029,785	400,259
Lead (tons)	7,072·17	94,788
Copper (tons)	22,943·80	2,005,215
Chrome Ore (tons)	717,910·84	2,273,431
Tungsten Ores (tons)	216·65	26,146
Coal (raised) (tons) (sales) . .	5,207.472	1,940,231
Antimony Ore (tons)	79·11	1,550
Asbestos (tons)	68,808·52	1,982,344
Arsenic (tons)	980·60	39,507
Ironstone (tons)·	29,604·42	4,198
Tin (tons)	14·68	2,671
Barytes (tons)	53·66	88
Mica (141 tons 1,276 lbs.)		36,132
Diamonds (carats)	13,599.375	63,964
Diamonds (carats)	13,599·375	62,964
Other Precious Stones (carats)	72,977	8,065
Grand total of mineral production to date		£58,387,118

Oceana Development.

The report for 1920 of the Oceana Development Co., Ltd., contains a proposal to increase the capital to £125,000 by the creation of 80,000 new 10s. shares. It is intended to offer immediately 50,000 of these at par to present shareholders in the proportion of one new share for every three now owned. Every subscriber will be granted the option on a second new share at par until June 30, 1924. The object of raising fresh funds is to finance the formation of a subsidiary, which has been provisionally registered under the name of the Northern Transvaal (Oceana) Cotton Estates, Ltd., and shareholders will in due course be invited to subscribe also for the issue to be made by this latter concern. It is stated that the experiments carried out fully justify the development of cotton-growing on a large scale in the Northern Transvaal, and " in the opinion of the experts the company's properties in the Spelonken are most favourably situated for this purpose." As regards the company's Far East Rand properties it is announced that the option granted to Dr. Hans Sauer has lapsed. The directors are considering the undertaking of agricultural operations upon the Koppieskraal and Eendracht farms, and the services of Mr. A. E. Swan have been provisionally engaged. The receipts and expenditure account for 1920 shows an adverse balance of £966, making the total debit balance to be carried forward £21,969.

Our Dividend List.

We much regret that owing to printer's errors some figures in our list of dividends last week were incorrect. The list inserted did not purpose to be final, but merely provisional until all the figures were available, and we print this week a revised and carefully checked table.

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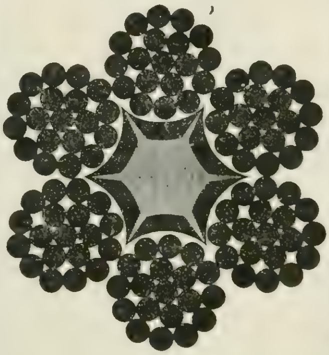

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PORTO RICO—San Juan, Mayaguez and Ponce. **HAITI**—Port-au-Prince.

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CAPITAL PAID UP & RESERVES $40.000.000
TOTAL RESOURCES OVER - - $600,000,000

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS STILL SLOW—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—AGRICULTURAL IMPLEMENTS—MINING COSTS—ELECTRICAL GOODS—UNION'S TRADE FOR JUNE—OIL—FINANCIAL—RESERVE BANK—NATIONAL BANK MEETING—COAL—AMERICAN FREIGHTS, TARIFFS & FARMERS—BREVITIES.

General Position.

Business is still on the slow side, with very few inquiries on the Commercial Exchange, where the cutting campaign is still being pushed by those merchants who are themselves being pushed, and trying to make out satisfactory balance sheets. The feeling is growing in commercial circles that the mines' reserve stocks are approaching exhaustion, and that within a short time their buying activities will give a much-needed fillip to the mining material market. Orders are coming in fairly satisfactorily from Rhodesia, but otherwise business is very quiet. We have not yet got into our July (new financial year) stride. It may be noted that barbed wire, which was selling recently at 45s. to 50s. per 98 lb. coils, is now being released at 25s.; galvanized iron, 24 ft. gauge, previously ruling at £54 a ton, is now going at £30 a ton. Now that the coal strike is at an end, there is undoubtedly a more buoyant feeling abroad, and an influential merchant thinks that within three or four months' time we shall see gradually improving conditions.

Iron and Steel.

Latest nominal quotations: Dunswart, 29s.; Union Steel Corp., Ltd., ordinary sized rounds, flats and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 49s. 6d.; ⅜ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 49s. 6d. to 62s.; ¼ in. square iron, 55s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. to 62s. 6d.; channels and joists, 47s. to 48s.; imported angles, 45s. to 47s.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in., ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 57s. 6d.; ⅝ in., 55s. per 100 lbs.; per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. to 57s.; shovels, 60s.; wheelbarrows, 55s.; picks, 45s. to 75s.; shovels, 60s. to 70s.; wheelbarrows, 70s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d. per 98 lb. coils; 24s. to 25s. per 68 lb. coils, large, 12 gauge, 28s. 6d. per 96 lb. coil; 14 gauge, 22s. 6d. per 66 lb. coil; plain wire, No. 8 galvanised, 35s., and black 32s. 6d. per 100 lb. coil.; fencing standards, 12, 14, and 16 lb., at 27s. 6d., 30s. and 32s. 6d. respectively per dozen; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb.; steel plates, £32 10s. to £36. Cast steel is £50 per ton; mild steel, £19 per ton.

British Steel Trade.

As showing the inability of the British steel trade to cope at present with outside competition, it may be mentioned that an order of steel axles, amounting to roughly £1,000,000, for the Indian State Railways, went to America, the Glasgow people's tender being 30 per cent. above the American quotation. It is said also that an Australian Government contract for 10,000 tons of steel rails has gone to the Continent, Britain, under present circumstances, being unable to successfully compete.

Combating Continental Steel Competition.

The Scottish manufacturers have reduced their prices of steel bars by £3 a ton, but in spite of this reduction their quotations for crown bars are £16 a ton as compared with Belgian £9 15s. delivered Britain. A further reduction is expected on Scottish prices now that the coal strike is settled. Glasgow locomotive manufacturers have, in face of American and Continental competition, secured a contract with the New Zealand railways for 45 engines.

Engineering Shops.

Fair progress has to be reported in respect of orders for general requirements, but industrialists report that the business activities leave scope for improvement.

New York reports that steel mills are at the moment operating at 25 per cent. capacity; lower levels are awaited.

Wage Reductions.

The Manchester cotton spinners have decided to accept the wages settlement.

The ballot of the British engineering employees in regard to the question of reduced wages shows a substantial majority against acceptance. Gas workers (about 90,000)

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TO BE ISSUED IN JULY.

have agreed to a reduction in wages of 6s. 9d. weekly. Railwaymen's wages have been reduced 5s. weekly from July 1.

From New York it is announced that the local Firemen's and Sailors' Unions have voted in favour of returning to work; the shipping strike is therefore at an end.

Timber and Building Materials.

Business is very quiet at the moment. Inquiries continue small. Stocks of timber are large. 3 x 9 deals are 1s. 2½d. to 1s. 3d.; scantlings, 1s. 1½d. to 1s. 3½d.; beaver board, 5d.; Oregon, 9s.; pitch pine, 9s. to 9s. 6d.; floorings, 8¼d. to 8½d.; ceilings, 5½d. to 6d.; corrugated iron, 24 gauge, 9½d. to 10d. Furniture timber, Burmah teak, 20s.; American oak, 1 in. to 3 in., 1s. 5d. to 1s. 6d. per super; American black walnut, 1 in. to 4 in., 1s. 6d. to 1s. 7d. per super; West African mahogany, 1 in. upwards, 2s. to 2s. 3d. per super; 3-ply ash, 5 m.m., 10d. per super. Bricks are running from 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; and £5 for pressed per 1,000 at kiln; white lime, 7s.; unslaked, 7s. 6d.; building lime, 4s. 3d.; plaster lime, 5s. 3d.; cement, 11s. 6d. a bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 47s.; 3-ply, 55s. 3d. The building trade remains inactive.

Second-hand Iron and Timber Yards.

Business is in the doldrums. Stocks are abundant. Iron is ruling at 6d.; timber at 10d. to 11d.; casements, 9s. to 20s.; mouldings from 2½d.

Agricultural Research.

The British Government has allocated £1,000,000 sterling for the furtherance of agricultural research.

Agricultural Implements.

The ploughing trials of motor tractors were held in May at the Experimental Farm of the Society of Agriculture, Transvaal University College, Pretoria. The official report states that there has been rapid development of the tractor trade in this country, with a big inquiry from farmers. Tractor dealers realised the importance of publicly testing their machines, and the trials were a big success. The object of the trials was to determine the efficiency of the tractors considered as plough tractors, and to find the cost of ploughing per acre for various types of soil and under conditions generally obtaining in the Transvaal. The competing tractors were of three types: wheel tractors, tracklayers, motor ploughs. Under No. 1, the Glasgow (agents, Messrs. Mangold Bros.) came out with flying colours. No. 2 were well represented by the Holt 10-ton caterpillar tractor, and No. 3 by the Avance motor plough, which has the motor and ploughs all in the one frame. The judges had no hesitation in giving the Glasgow machine the highest score for ploughing. In this connection the Denver Rock Drill and Machinery Co., Ltd., also achieved very successful results by their Case tractor and the Grand Detour ploughs. Mr. Harris, the widely respected representative of the company, is demonstrating these.

Mining Costs.

The Chamber of Mines, in their reply to the memorandum submitted by the affiliated unions on the wage question, emphasised the basic fact that the average cost per ton milled in 1914 was 17s. 1d., and had reached last year 25s. 8d. and 26s. 6d. for the first five months of 1921. And this notwithstanding that a decrease in the cost of living had occurred and is still in operation. The premium on gold is naturally no criterion on which to base economic conditions in respect of the working of the gold mines and the present upward curve will eventually give place to more normal conditions as soon as the factors now tending towards a hardening of the American Exchange have disappeared. Wages have to come down irrespective of the ephemeral gold premium, to enable many of our low-grade mines to carry on. The Chamber of Mines has now withdrawn its claim for a reduction of 3s. per shift in the wages paid on the mines, but takes up the standpoint that a reduction in wages must take place. The matter is now being discussed by the various Unions.

Electrical Goods.

Business is very slow in this department owing to the continued inactivity in the building trade. Orders are very scarce from outside. With the coal strike settled at Home the tendency there must be easier towards lower prices shortly, but the reflection of that position will only be gradual. Stocks are abundant in all lines.

Electrification Extraordinary.

According to the "Manchester Dispatch," a gigantic scheme for the electrification of England is under way. It provides for the concentration of the power of production regarding factories, railways, etc.

Copper Discoveries.

Rich deposits of copper are reported from Sandwick, in the Shetland Islands, where extensive exploratory works have been in hand for some months. The consulting engineer states that upwards of 200,000 tons of ore have already been located.

Union's Trade for June.

The following is a statement of the value of imports and the revenue collections for June:—

	Imports. £	Exports. £	Gross Revenue. £
Capetown...	658,259	3,211,995*	78,932
Port Elizabeth	707,422	307,387	61,603
East London	293,106	311,564	24,083
Durban...	1,068,519	736,483	107,530
Johannesburg	—	—	68,648
Lourenco Marques	399,120	—	14,579
G.P.O.	—	—	18,453
Other ports and stations	12,550	30,815	15,384
Total	£3,138,976	4,598,244	393,218

* Includes £2,860,056 gold exported at Capetown.

Oil.

The Glasgow Burmah Oil Co. declared a dividend of 30 per cent. on the ordinary shares for 1920. The profits of the year amounted to nearly £5,000,000.

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Financial.

Great Britain's external debt on March 31 was £1,161,500,000, showing a reduction of £200,000,000 during the last two years. The United States figures as principal creditor for £972,750,000; Canada, £55,250,000.

The National Bank Meeting.

The Honourable Hugh Crawford, presiding at the annual meeting of shareholders, stated that notwithstanding the economic upheaval in financial affairs throughout the world, the Bank had been able to increase its reserve fund to £1,300,000, to make a profit of £338,881, and carried forward to reserve £50,000, in addition to substantial increments to the officers' pension fund, and recommended a dividend of 8 per cent. This state of affairs, under the trying circumstances of the year, must be regarded as entirely satisfactory. Mr. Crawford's warning to the mine workers to face facts in respect of wage reductions, should not go unheeded.

British Coal Imports.

Britain's coal imports have since April 1 (the strike day) amounted to 335,000 tons from the United States, 430,000 from France, and 495,000 tons from Belgium. Included in the latter were 160,000 tons of German origin.

German Coal Output.

Berlin advises that the coal output at the beginning of this year was 12,000,000 tons monthly, compared with 9,000,000 tons monthly in 1919.

American Tariffs.

Freight rates, it is stated, must be lowered or they will drive many farmers out of business. The present rates are destructive of business, and some readjustment must be made towards a lower level. These affect also the timber products. The present freight on farmers' produce is 19.8 cents, as compared with 7.8 cents in 1918.

Brevities.

The Board of Trade returns for April show imports at £89,995,504, exports £59,867,585 (British) and £8,523,662 (foreign and Colonial).

The Pretoria Mint will, according to the announcement of the Acting Prime Minister, soon be minting our own coins and those of other parts of the world. The Government is spending £250,000 on the equipment of the Mint.

The special mission of General Smuts to Ireland as peace ambassador is of the very greatest importance. Anything tending towards ameliorative conditions in that quarter will be very welcome. It is, of course, too early to speculate on probable developments, but let us hope that some "bull" points, at any rate, may result.

Metal Market.

Latest quotations: Standard copper, £71 18s. 9d. cash, £72 3s. 9d. forward; electrolytic copper, £75 10s. cash, £77 10s. forward; Straits tin, £169 2s. 6d. cash, £171 2s. 6d. forward; English lead £33 5s. cash £23 8s. 6d. forward; silver, 35¼d., and fine gold 110s. 1d. per oz.

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MINE SURVEYORS' CERTIFICATES.—We have secured **55** Certificates to date, and lead with passes by more than **10 to 1.**

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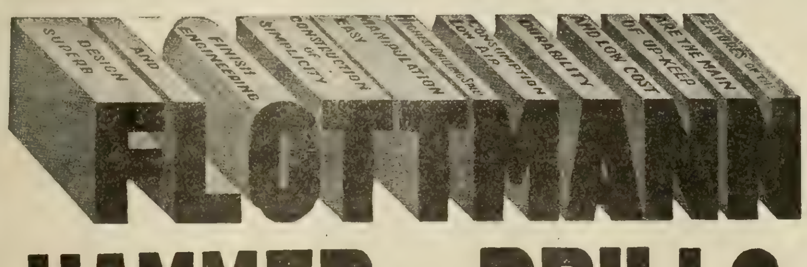

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Read "The Outlook for Diamonds," in this Issue.

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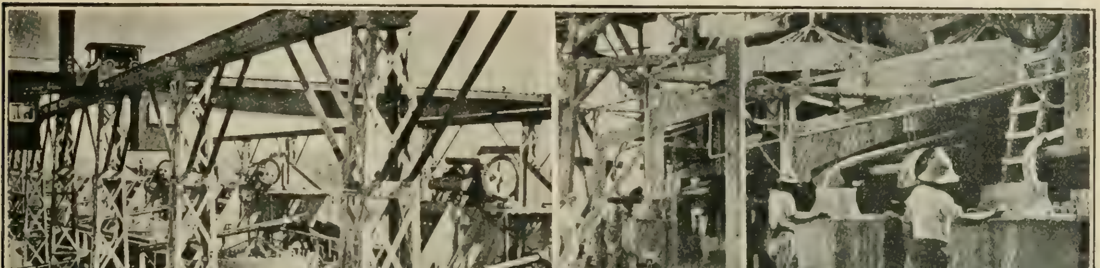
Vol. XXXII., Part I. JOHANNESBURG, TRANSVAAL, SATURDAY, JULY 16, 1921. No. 1555.

OUR REVIVING DIAMOND INDUSTRY.



The Diamond Market, after an acute period of depression, is beginning to show sure signs of revival. The outlook for South Africa's diamond propositions is discussed at length in an important article appearing in this issue. The four photographs given above illustrate typical scenes on the Diamond Fields—(1) Premier Mine No. 3 Washing Plant, (2) Drawing off Concentrates from Pans at Kimberley, (3) A Scene at the Premier Mine, and (4) The Mine Compound Hospital, Dutoitspan. Other illustrations, including photographs of the South-West African Fields, accompany the article.

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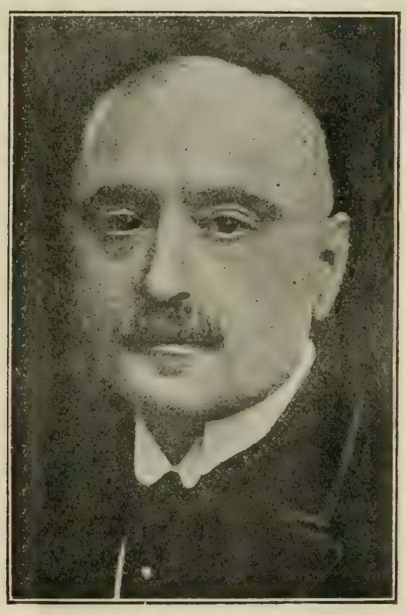
The Improving Outlook for Diamonds.

MARKET POSITION NOT AS BLACK AS PAINTED—RETAIL DEMAND CONSTANT—EXPECTED GOOD EFFECT OF AMERICAN HARVEST AND CHRISTMAS SEASONAL DEMAND—HISTORY OF THE DEBACLE —THE LATEST PROPHECY.

Competent and careful observers have lately been examining the data available from all over the diamond-buying world with encouraging results. They have found that the retail market for good-sized stones has suffered comparatively little in the slump. What has been named the "normal" retail demand has not fallen off appreciably, since good quality and good size stones are always in demand. The market for small stones and for stones of second-best quality has certainly suffered, but the mainstay of the retail market has been only slightly affected. That is the cardinal fact of the situation, and it means that when the demand freshens under the happier auspices of an abundant American harvest, and the usual increased seasonal demands of Christmas, we may reasonably hope for a real improvement in the market.

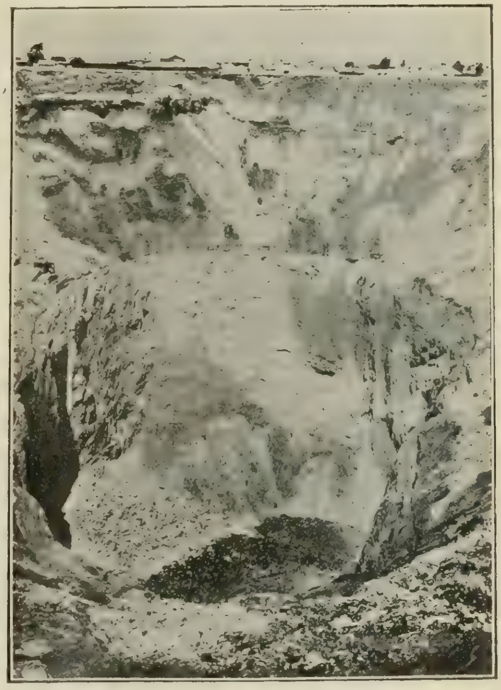
The American Outlook.

It may be of interest to examine the American outlook more closely. The New York correspondent of the *Morning Post* recently summed up the matter by stating:—"Decided improvement in business is expected in the latter half of this year." In greater detail we note from the American papers latest to hand that a recrudescence of speculative and investment activity in American railroad issues has for some time past been noticeable in the New York Stock Exchange. In the first week of the current month twenty representative railroad securities appreciated 3.06 points to 74.31, as compared with 73.76 on the corresponding date last year. The rise was influenced more by optimism as regards prospects than by any encouraging features so far revealed in the monthly reports for the year. The reduction in rediscount rates by the New York, Chicago and other Federal Reserve Banks, and the greater ease in call money rates have helped professional dealers, who are hopeful that the gold basis of credit will be further widened, correspondingly increasing the supply of available funds. Net receipts of gold in March and April were amongst the highest recorded for the United States in any two months since the War. The reduction of prices by the Steel Corporation and independent producers, though it has not encouraged that revival in demand which was anticipated, is also considered a factor in favour of the railroads as tending to reduce maintenance of way and equipment charges. The most cheerful news has, however, been the ruling of the Labour Board as regards the abrogation or termination of the labour agreements entered into during the War period, and the possibility that managements will be able to divest themselves of a large portion of the burden of high charges.



The late Sir Bernard Oppenheimer, Bart., one of the leading lights of the Diamond Industry.

If, as most authorities seem to think, the American harvest turns out a bumper one, there are, therefore, good reasons, based on the solid ground of American prosperity, for a revival of the demand from that side, which is always, of course, a big factor in the position.



The Open Workings of the Old Kimberley Mine.

The Continental Outlook.

The appreciation of the franc, as we mentioned last week, in terms of sterling, has encouraged the rebuying of diamond shares—not stones—and share dealings will, of course, reflect the fluctuations of the franc in the immediate future. But the Continental influence is most marked in regard to the sales of stones coming from Russian and German sources. Whether and to what extent the flow of stones from Russia is now dwindling we cannot say. In the nature of things, it is certain that the supply is far from inexhaustible, and the bulk of the diamond treasures—Royal and private—of the late Czar's Empire is now, doubtless, liquidated. As regards the East, the interesting fact may be noted that at a meeting of Indian ladies at Calcutta who are supporting Mr. Ghandi's campaign, it was resolved to boycott the use and wearing of diamonds since they came from South Africa, which refused equal rights to Indians. It is not thought that the movement will do the diamond market much harm.

A Little History.

The big debacle in the diamond trade is, it will be remembered, only about six months old. Last February the blow fell on the diamond industry of this country, and set it reeling with the suddenness and severity of the shock. In quick succession the Kimberley mines were closed down, the Premier mine reduced to one shift, and a host of smaller producers put out of action altogether—temporarily we hope. The Frank Smith, the New Eland, the Roberts Victor, and the Postmas were all reluctantly compelled to suspend production, and unfortunate shareholders lost large sums in these ventures, due to this blow from a quarter whence they least expected it. We need not dwell on the painful sequel of poverty and unemployment at Kimberley and on the diamond diggings. The facts are too recent and too poignant to be repeated. The thing to remember is that the diamond market is dependent on the state of the world's credit and spending capacity. When that recovers from the debacle of the beginning of this year assuredly the demand for diamonds will recover. Perhaps the whole position was most truly and briefly summed up by Sir Lionel Philips at the Central Mining meeting the other day. Speaking on this subject, he said—" A similar falling-off in the diamond trade has occurred many times in the past. It has invariably been followed by an active revival, and we are confident, therefore, that with the return of profit-earning times our stocks will speedily melt away. .. . . When we remember that as gems they are unique, that entire failure has attended all efforts to imitate them, and that they represent a trifling sum in the world's expenditure upon indulgences we can hold on with patient equanimity." This, of course, is the last word on the matter, and we must watch the signs of an improvement in world trade for an improvement in the diamond market. Fortunately these signs may now be expected with increasing confidence.

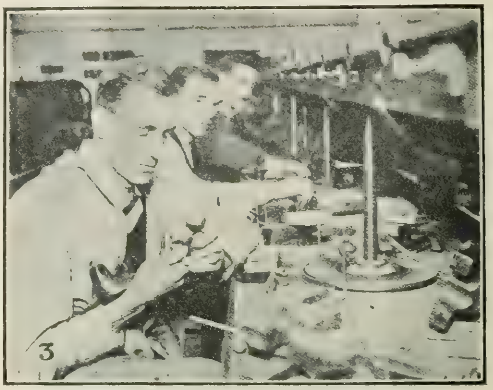
* * * *

THE CONGO KIMBERLITE.

Recent discussion of the Congo diamond fields lends interest to the following notes by Dr. P. A. Wagner on kimberlite from that territory, read before the Science Congress in July last year. *Inter alia*, Dr. Wagner said:—

" Some thirty separate occurrences of kimberlite have so far been discovered in the Katanga division of the Belgian Congo. The majority of these are situated on the Kundelungu Plateau, but there are also several occurrences in the foothills by which the plateau is flanked on the east, and at least two occurrences on the plains between the plateau and the Luapula River. These plains have a mean elevation of between 3,200 and 3,400 feet above sea-level, while the altitude of the plateau ranges from 4,500 to well over 5,000 feet.

Blinded Soldiers cutting Diamonds at the Brighton Works, established by the late Sir Bernard Oppenheimer.



The Process of Putting Facets on the Stones.

The country rock in every instance is red felspathic Kundelungu sandstone, correlated by Studt with the Pretoria series of the Transvaal system. In a previous reference to the deposits the writer distinguished between (a) the Eastern Kundelungu Group, that includes about twenty occurrences arranged in a curved line intersecting at an acute angle the eastern edge of the plateau, and (b) the Western Kundelungu Group, including twelve occurrences situated near the western edge of the plateau. All of these occurrences, which comprise pipes, chonoliths and dykes, have by this time been

Typical South African Diamond Workings.

thoroughly tested, and while some have been found to carry diamonds of good quality, none of them appear to be worthy of exploitation. The largest diamond found weighed 6 carats. The average weight of the stones recovered is stated to have been about one-sixth carat. The kimberlite appears throughout to be of the basaltic variety, and we are here clearly dealing with a province of basaltic kimberlite, the precise limits of which have yet to be defined. The pipes and dykes yield the same assemblage of minerals as the kimberlite occurrences of South Africa, and some of them are rich in nodular xenoliths of the cognate type. Studt, who published in 1912 an interesting description of the Eastern Kundelungu Group, was the first to remark on the similarity between the kimberlite of certain of the occurrences and that of the Kimberley mines. This the writer was able to confirm by microscopic examination in the case of the 'hardebank' of the Kambeli pipe, situated on one of the tributaries of the Luchipuka River. Some time ago he received from Mr. M. Poulsen a fine specimen of comparatively fresh kimberlite from the Msipashi pipe, situated some miles to the north-east of the Kambeli pipe, which again proved to be practically identical with the kimberlite from the lower levels of the Kimberley pipe. . . . The kimberlite, both in its megascopic and microscopic character is almost identical with that of the Kimberley Mine, situated some 1,200 miles to the south—proof, if any were needed, of the correctness of Carvill Lewis's contention that kimberlite is a distinctive rock type, and entitled as such to a specific designation."

A Picturesque Scene on the Spencer Bay Diamond Fields, S.-W. Africa.

The Late Sir Bernard Oppenheimer on the Diamond Position.

A melancholy interest attaches at this juncture to the views of the late Sir B. Oppenheimer expressed in March last, when everyone was asking about the future of the diamond market. The late Sir Bernard Oppenheimer, interviewed by Reuter, agreed with a statement by Mr. Alpheus F. Williams, General Manager of De Beers Consolidated Mines, Ltd., that the slump in diamonds of high quality was largely due to the export of diamonds from Russia. Sir Bernard expressed the opinion that the slump was only temporary, because unlimited buying at high prices had also contributed to the crisis. He quoted Sir Julius Wernher's statement that slumps were bound to come sometimes, and when they did arrive the great producers' only policy was masterly inactivity for a period. Now that the big mines were temporarily stopping production, he (Sir Bernard) declared there was no need for alarm, as already the Continent was again beginning to buy diamonds.

* * * *

Diamond Shares as an Investment.

Investors in diamond shares at the comparatively high prices prevailing last year may take unction to their soul that had they put their money in almost any other form of mining enterprise their losses would have been at least equally as great. This is how Mr. Walter McDermott put it at the recent annual meeting of the "C.M.S." in London:

In exposing the position to you last year, I used these words —"The new diamond business may have its own risks and disappointments, but it seems to be free from certain others peculiar to the gold-mining business; so it offers a temptation, both as a new opening and as a means of averaging risks." At that time all was well and flourishing in the diamond trade, in spite of the natural feeling I referred to in saying— "In the chaos of reconstruction and the welter of world indebtedness, it would seem as if diamonds could be well dispensed with, and their production should be, therefore, a risky business." Well, we took the risk of acquiring 8 per cent. convertible debentures in the Consolidated Diamond Mines of South-West Africa, as we have taken many other risks in the history of our business, and for the moment we are facing a period of disappointments in our new venture, due to such a falling off in demand as to necessitate the stoppage of production of diamonds. If, however, we had made an equivalent investment in the mining of lead, zinc, copper, silver, or coal we should to-day be just as disappointed in the present conditions of world industry, and we feel no doubt as to those conditions improving in time for diamonds as well as for what are considered more necessary products of the earth. We have had our high opinion of the ultimate value of the diamond properties confirmed by a very favourable report by our consulting engineer. There are times when the averaging of risks shows no benefit, for sometimes everything goes wrong with a surprising unanimity.

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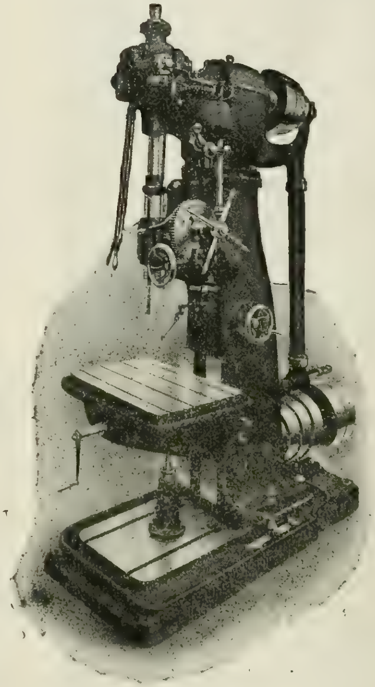

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More Kimberley Recollections.

THE FINDING OF THE FIRST DIAMOND—ON THE BANKS OF THE KEI GARIEP—THE JOURNEY FROM CAPE TOWN IN 1870—PERSONALITIES OF HALF-A-CENTURY AGO.

(By W. P. Taylor.)

In this most interesting article Mr. W. P. Taylor continues his reminiscences of the early days at Kimberley—"the cradle of South African industry." He carries us back half-a-century and depicts the Diamond Fields as they were seen through the eyes of a South African boy, eleven years of age. Mr. Taylor has made and lost several fortunes in this country, and it is most interesting to retrace with him the passage of the years and to listen to his alluring rhyme of the discovery of the first diamond on the banks of the Kei Gariep.

There has been a lot of controversy in connection with the discovery of the first diamond, the discovery of Kimberley, and latterly, with the discovery of the Rand. Now, as no monuments are to be erected or bonuses paid, what does it matter? Though I wonder if any of the actors are alive who handled the first diamond.

The story of the stone found on the banks of the Orange River has been the story accepted. Mr. O'Reilly secured it for Sir Phillip Wodehouse, the then Governor of the Cape, and here it is in rhyme:—

The Song of the Diamond.

I was born on the banks of the Kei Gariep,
There's a click on the Kei, you know;
From a pebble's mound the light I found
In the days of long ago.

I had lain in the sands of the Kei Gariep,
Where I caught the lustre bright
Of moons and suns, through long years runs,
In dazzled glories bright.

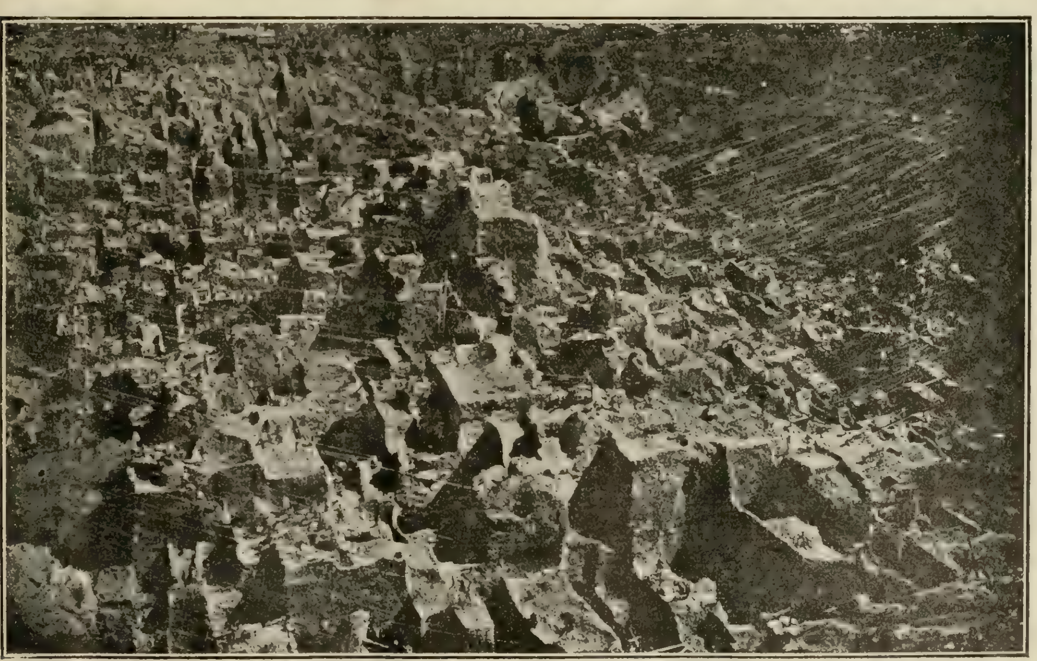
There were Bushmen wild on Kei Gariep,
With poisoned arrow and bow,
Who spurned my light as I caught their sight
In the midday's fiery glow.

For ages I lay at the Kei Gariep,
With the shadows of time in play,
'Neath the blue bush shade, where the duiker laid,
Till he bounded in fright away.

There the lion rested beside my couch:
He has coursed in bounds and bounds,
To the deathly spring on the zebra's ring,
When he utterd his thunderous sounds.

Then the white man came to the Kei Gariep
With lumbrous wagon, and whip
On the bullock's back, with angry crack,
And mark of a burning strip.

The shepherd lad on Kei Gariep
Played with pebbles upon the sand;
When he saw my light he grasped me tight,
Though he knew not my kingly brand.



The Kimberley Diamond Mine in the early days.

For all I was loved at the Kei Gariep,
Who knows with a love sincere,
Though a Bushman's bride (the world may deride)
Was first to hold me dear.

Then my lustre bright caught a Dutchman's sight,
With lethargic Ja, he sighed;
And Oog Alamagtig, die kliptje is praagtig,
Through the curling smoke he cried.

As my history moved, the magistrate's eye
Saw glistening surface and shape;
"'Tis a diamond," he cried, and his voice carried wide,
Till it reached to Afric's Cape.

There they hailed me star, The Star of the South,
First gem for a country's pride;
In a rush to the North the men set forth
To a search that was far and wide.

But I was born on the Kei Gariep,
The river that's wide and slow;
There I first brought the light of a diamond bright
From the ages of long ago.

Perhaps if you search near the Kei Gariep
(There's a click on the Kei, you know),
You may find 'neath the shade, where the duiker laid,
An emblem of long ago.

Fifty-one Years Ago.

When my father and I left Cape Town in 1870 the terminus of the railway was at Wellington. There were mule wagons to be equipped, and it delayed us a few days. At last we sped forth. A Mrs. Borgstrom travelled with us, and we picked up a good-looking young fellow called Brooks; one of those sort of men who didn't seem to know where he came from nor where he was going. He wasn't useful, but happening to be good looking and a pleasant fellow, seemingly lost, he was accepted as one of us, and went North. We climbed through Bain's Kloof, crossed an angry red, flooded river, and found ourselves in a beautiful village called Ceres, and then we seemed to leave for another world, for when we came to the Karroo and its miles of dry little bushes, with no trees, and an endless hot day, I wept. Poor little urchin that I was! I so loved the Cape and its mountains and trees that I had never thought the world could be otherwise. I grew homesick and wanted to go back to my mother. The more I thought of it, the more I loathed the hot dry shale of the Karroo and its inevitable short scrub, but with the dryness I hardened the softness of my skin, and my mind matured. I suppose my little brain began to forget, for I walked with men who went to shoot hares, and my nostrils accepted the acrid scents, the aroma of herbs and bushes, and I accepted rivers without water and birds without song. I became more thoroughly African.

Across the Wild Karroo.

As we travelled on we met numerous people of all kinds with all sorts of conveyances—smart Cape carts with four greys, all stabled carriage horses, taken from luxurious stables; ox wagons, donkey wagons, carts with four donkeys, and men walking with loaded donkeys. Then there were dead animals and my first sight of vultures. In time it became a long dry desolate track and our wayfaring friends begged water, matches, tobacco and bread. My father was so moved that, when he arrived at Victoria West, he wrote a stirring little poem for a Cape paper. I can still remember its opening lines:—

"He left his home, with tearful eye,
Bade round a fond adieu,
And manfully he took his path
Across the wild Karroo."

I cannot remember how it ended, but I think the bleached bones of the tramp were scattered under the hot desert's sun, and blown with the flotsam and jetsam of world waste. At that time a friend of mine, at a little village called George, caught the fever badly. He had a friend called Arnold. And then there was the Baron Von Kraut.

The Baron Von Kraut.

I knew them all. My friend's name was Valerian Litkie. I might here mention that the Baron was unique, the only one of his kind. He had beautiful blue eyes, lovely soft silky whiskers, and played the piano divinely, and his sister was lady-in-waiting to the late Empress of Austria. In those days he was a find, and I don't know how many ladies found him. True to his caste, he never sought wealth; he lived for pleasure. The first money he could lay hands on was converted into a great showy yellow dog-cart, and with a pair of steppers he visited ladies and they joy rode with him; but in the little village the jeweller, the lawyer and the beau put on their considering caps and decided to move. One man found a cart, another horses, and their wives put up food for the road, and with large coloured posters they

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announced themselves as the Valerian Arnoldi Opera Co.! To start with, the Baron was the music, Arnold had a good tenor voice, and my dear old friend Litkie was finance. Then, on arriving at a place, the Baron called on the first ladies of the town and at once arranged a concert. He got all the town's amateur talent to assist, and the result was a crowded house. The horses were stuffed, and the company proceeded to the next village. All went well until one night the tenor caught a cold and couldn't sing. To return money was impossible. My friend had to sing, a thing he had never done before. However, he had a deep loud baritone, and he undertook to sing "The Arab to his Steed." Luckily the Baron had coached him, and he filled the hall with great sounding notes and got a most vociferous encore. I believe he sang it four times; then the Baron played, and eventually a kind-hearted Samaritan gave some humorous recitations, and the performance scraped through; but he always assured me it was a mighty effort. Poor old Von Kraut; he afterwards got killed, loving another man's wife not wisely but too well. Human life has its sameness, education imparts humour, and we looked for fun fifty years ago just as we do to-day. I wish I could tell some of my stories in Dutch, for there is wonderful humour in the Taal. I don't say that it is in its grammar or its music, but some of the Dutch stories are exceedingly funny, and their humour is lost in the telling.

"Time is Valuable."

My friend Litkie mended a farmer's watch in Kimberley and charged him 35/-. The farmer expostulated and would not pay. At last he was made to understand how valuable time was, and he paid. Some time afterwards Litkie drove to the Colony, and when he came to the Riet river he found it impassable. His driver told him he would swim the horses across and arrange to hook the cart behind a wagon just then going over. This was done, and when Litkie politely asked the Dutchman how much it would cost, he was staggered when he said 35/-. Too much, much too much, said Litkie. "My friend," said the Dutchman, "it's exactly as much as repairing a little watch, and 'time is valuable.'"

Coal Dust as Gold Dust.

At the Conference arranged by the Higher Production Council at the Efficiency Exhibition at Olympia, the subject of "Fuel Efficiency," with special reference to coal and gas, was discussed. Sir Richard Redmayne, chairman of the Imperial Mineral Resources Bureau, and late Chief Inspector of Mines, presided, and said the object of the conference was to consider the best method of using our greatest national asset—coal. Many people were hoping and expecting to see coal fuel at the price it was before the war. It might fall temporarily, but that it would remain for any length of time at a pre-war price he did not for a moment believe. The aim and object of scientific men was to endeavour to work out some method of commercially possible low-temperature carbonisation by which by-products could be recovered, and a fuel left which was capable of being used for domestic purposes. He referred to the system of pulverised fuel which had been so largely applied in America and to the still more recent mixture of pulverized coal and oil known as colloidal fuel. There was no doubt that from the tests he had himself seen, colloidal fuel had come to stay. Bulk for bulk it gave practically the same results as oil, and one of its advantages was that it enabled vast deposits of coal of low calorific value, which existed in some of the Dominions, to be utilized. Mr. John Drummond Paton (Manchester), in a paper on the subject, said that in 1919 and 1920 coal dust had become gold dust, and as gold was the basis of British industry and coal was the nearest approach to gold, we should utilize every ounce of coal to the extent of its maximum value. If coal dust could be utilized in many cases inferior coal might be found even of higher value, because of the oil it contained, than the coal which was looked upon as good coal.

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American Capital for South Africa?

REPRESENTATIVES OF BIG NEW YORK INTERESTS IN THE COUNTRY—THE UNION'S UNLIMITED AND UNDEVELOPED WEALTH—HOW IT WOULD RESPOND TO THE TOUCH OF THE DOLLAR—A GRAPHIC REPRESENTATION OF RICHES—"THE LAND WITHOUT A LEADER"—OUR MINERAL OUTPUT JUST ON A THOUSAND MILLIONS STERLING—THE SCHLESINGER RUMOUR—OUR UNHARNESSED WATER POWER—A LESSON FROM NIAGARA.

The possible association on a large scale of American capital with South Africa is a theme that is being much debated at the present time. Although nothing definite is known, it is, in usually well-informed quarters, believed that more dollars are likely to find their way into this country in the near future than ever have come here in the past. We do not of course intend to debate the rumour which is said to be going around Capetown, and which is to the effect that Mr. Schlesinger's visit to the United States is to procure twenty millions sterling for the Union Government, although we think that Mr. Schlesinger would be more likely to succeed in such a mission than the Union's present Minister of Finance! But there do appear to be some grounds for believing that American capitalists are very much alive to the glowing prospects of this country, and in the accompanying article an effort is made to portray the magnificent scope for enterprise that exists in South Africa.

It may not be generally known that for some months past representatives of one of the largest financial groups in the United States have been touring South Africa and have been investigating various mineral and industrial propositions. Their work has been quiet and unostentatious and various motives have been imputed to them. Some have it that American capital is going to make a big incursion into our Coal Fields. Another view is that the Congo Diamond Fields are the real objective of the investigators. In other minds the presence of these visitors from the Land of Dollars is associated with the secret of the pending big industrial developments which have been referred to by the Government.

"Not on a Health Trip."

But whatever the objects of their visit may be, one can safely assume that the representatives of one of the very biggest of the "big noises" in the States are not out here on a health trip.

We have from time to time heard much of and hoped for a great deal from the entry of American capital into this country. Years ago there were rumours that New York financiers were going to acquire Randfontein, and in 1919 an offer from the States to finance the Western Rand Estates was unfortunately refused at a time when negotiations had progressed satisfactorily almost to the point of consummation.

American Capital in South Africa.

More recently we have had the active co-operation of American capitalists in the development of the Anglo-American—Consolidated Mines Selection—Consolidated Diamonds group of interests, and in the Congo Diamond Fields. Thomas F. Ryan and his associates have brought the Kasai areas to a state of production on a fairly large scale. But there have been no very extensive inroads made by Yankee capital into the fields of South African industry. American capital has a stay-at-home tendency, and in view of the immense resources of the United States it is not altogether to be wondered at that American financiers, unlike the

The Rand-Zambesi Power Scheme.—The Victoria Falls.

If the Americans had a controlling hand in South Africa they would very soon make Victoria Falls Power an actuality instead of a mere catch-phrase, as it is to-day.

capitalists of the tight little Islands, have not distributed their wealth so that the sun may never sink upon their money. Signs are not, however, lacking that the dollar is seeking avenues of use and employment in parts of the Old World as well as the New, and the fact that no other undeveloped country has such vast and varied resources as South Africa assumes a fresh measure of interest when taken in conjunction with the knowledge that envoys of one of the biggest corporations in the United States are now touring the Union, presumably with the intention of spying out the land and the acquisition of attractive interests.

The Union's Wealth.

In no other portion of the earth will they find such a diversity of unexploited wealth as in South Africa—this "Land without a Leader"—which, despite its potential greatness, is in a state of poverty to-day. In this issue we reproduce a chart which depicts some of the essential features of the Union of South Africa, and which will help one to focus in true perspective upon the undeveloped riches and immeasurable prospects of the country.

A Graphic Representation of our Riches.

The diagram is taken from *The Times Weekly Edition*, and we acknowledge our indebtedness to that great paper for the graphic representation of the country's geographical and economic features. The diagram, although it was drawn only the other day, dealt, however, with exports only up to the end of 1918. We have therefore taken the liberty of bringing the compilation more up-to-date. This, however, has not proved an easy task. It is in some respects typical of the lack of appreciation of South Africa's resources which obtains overseas that the chart was not drawn on a sufficiently large scale to allow of a graphic representation of the growth of the diamond and wool exports. These in fact, in respect of the years 1919 and 1920, go quite out of the picture, and although these two industries have recently experienced very severe depression, it is at least reasonable to anticipate that they will once again witness revival and prosperity.

What America does with her Water Power.

How the water is returned to the river over submerged wall. at Niagara.

Mineral Production to Date, nearly a Thousand Millions.

We may supplement the figures given in this table by stating that the grand total value of all minerals produced in South Africa up to the end of 1920 is nine hundred and fifty-five and a half millions sterling. This gigantic total is made up as follows:

Gold	£667,528,135
Diamonds	216,797,197
Coal	18,858,582
Copper	22,944,296
Tin	4,444,774
Grand Total, all Minerals...	£955,587,946

What We Produce.

Some further figures which will prove useful in contemplating the diagram relate to the export of South African produce for the past two years. The principal items are:—

	1919.	1920.
Maize and Maize Meal ...	£2,981,588	£786,023
Flour and Meal, Wheaten ...	68,820	63,269
Corn and Grain	382,931	103,748
Cheese	80,417	21,953
Candles	11,710	15,061
Eggs	61,456	95,440
Fruit, Fresh	65,425	171,944
Fruit, Dried, etc.	199,249	176,230
Confectionery and Jams ...	235,335	148,056
Meat, Frozen and Fresh ...	1,084,745	318,546
Sugar and Sugar Products...	487,202	517,457
Tobacco	137,326	182,063
Hides and Skins—		
Ox and Cow	1,068,053	1,182,317
Sheep, Goat and other	3,908,349	3,051,577
Wool	17,919,088	15,988,103
Ostrich Feathers	1,646,014	547,336
Angora Hair	1,654,235	518,973
Wattle Bark	386,096	662,515
Bark Extracts	216,086	323,969
Cotton, Raw	19,251	69,830
Wood and Timber	12,623	43,811

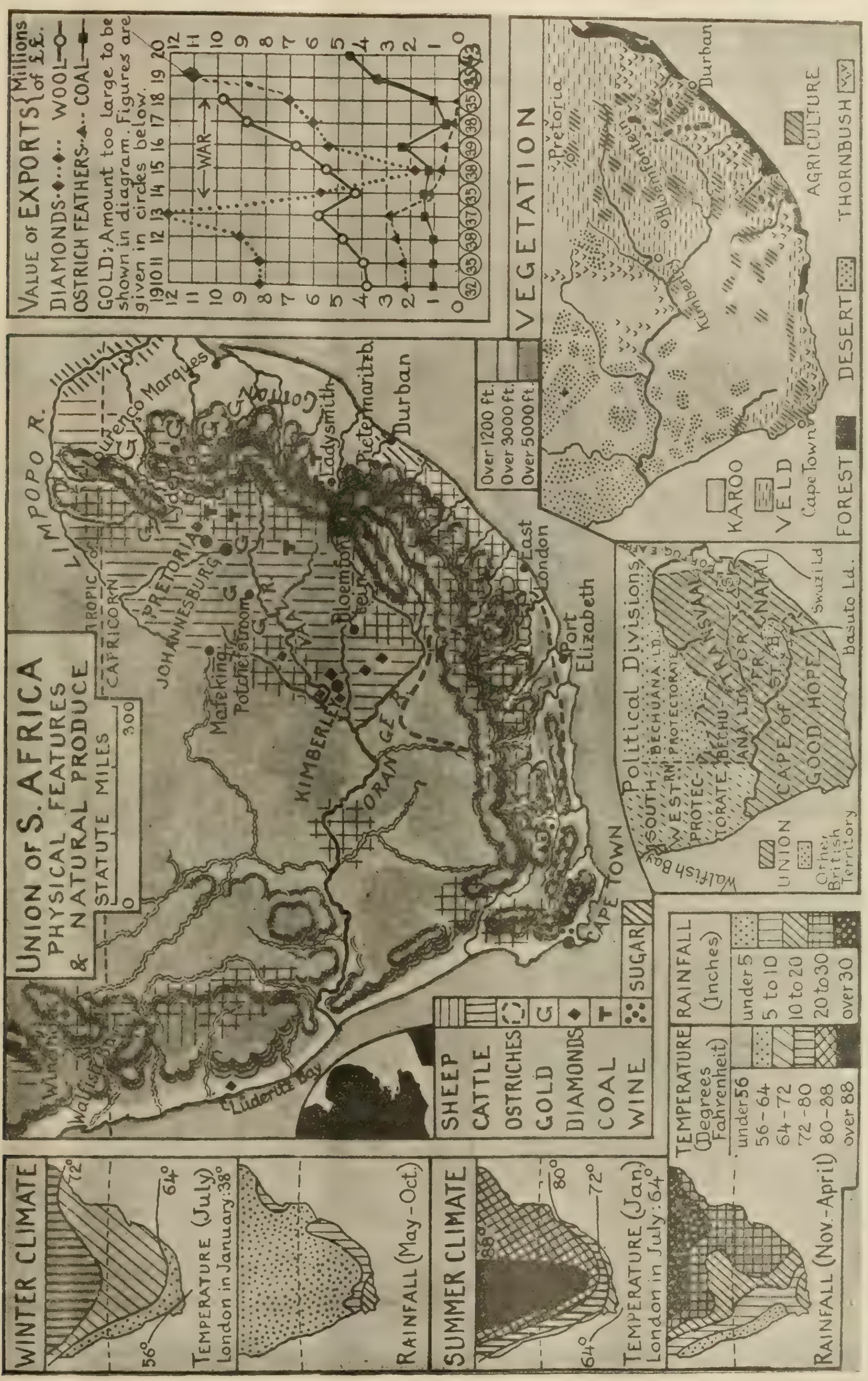
What the Americans would do with Africa.

Whilst everybody will agree with the statement that South Africa, which has already produced during the short years of its industrial existence minerals to the value of a thousand million pounds, is indeed a land of milk and honey, few will be inclined to the belief that the Government and the captains of industry have developed the country to anything like the state of exploitation and settlement in which it should be to-day. Our views on this subject were very clearly set forth in the article which appeared in our issue of July 2nd under the heading of "The Land without a Leader," and we will not repeat them here.

A Lesson for South Africa.

Industrial Power Installations at Niagara.

But arising out of the voluminous correspondence which we have received on the subject of our criticisms, there is a point which merits attention in connection with the present article. A correspondent says he would like to see America gain industrial possession of the Union, and still more would he like to observe the transformation which would be wrought by them in ten years time or even less. The desire, although it scarcely may come within the range of practical and present-day politics, affords interesting food for reflection and imagination. Supposing for a moment that the United States did obtain a dominating partnership in South Africa, what would they do? Undoubtedly they would break down the barriers which at present hamper immigration. They would amend the mining laws so that enterprise would be encouraged instead of discouraged. They would galvanize our somnolent mining houses into activity, and they would initiate huge schemes of water conservation, irrigation and forestry. They would build railways and open up the land. They would convert the Lebombo Flats into one of the greatest cotton-growing territories on earth They



Physical Features and Resources of South Africa. A Chart reproduced from "The Times."

would establish by-product plants on the Coal Fields, and with the tar those plants produced they would macadamise thousands of miles of roads. They would open up new harbours on the coast and bridge the missing links in our obsolete railway systems and they would harness the water power of the Victoria and Aughrabies Falls and bid the waters work for the country.

We need not carry this dream further. But let us for a moment contrast, for instance, the American way with the South African method in regard to one thing only, and that is the utilisation of water power resources to drive the engine of industry.

The Victoria Falls and Niagara: A Contrast in Ideas.

Although the Victoria Falls and Transvaal Power Company has now been in existence for nearly fifteen years, no attempt has yet been made to undertake the great project for the carrying out of which the company was originally floated, *i.e.*, to develop electrical horse power by harnessing the Falls and to deliver the power so generated to the larger industrial centres of Central South Africa.

The romantic ambition of such an undertaking won for the Victoria Falls Company a good deal of popularity some years ago in engineering circles. The prospect also appealed to people of the wealthy old maiden aunt class, who, dazzled by the splendour of the conception, did not hesitate to invest money in the scheme. The flotation of the Falls Power Company, on the other hand, offended the susceptibilities of certain worshippers at the shrine of scenic beauty. It was, however, represented that the natural splendour of the Falls would in no way be impaired by the scheme, and this, combined with authoritative engineering opinion that the project was feasible, and with authoritative commercial opinion as to the magnitude of the Transvaal market for electrical power, conspired to bring about the registration in October, 1906, of the Victoria Falls and Transvaal Power Company, Ltd. This Company acquired through the promoters (the African Concessions Syndicate, Ltd.) the preferential right to develop 250,000 electrical horse power from the Falls to the Transvaal Colony. These rights were granted for a period of 75 years from December, 1906, by the British South Africa Company to the vendors, and the consideration was £1,120,000, payable £120,000 cash and £1,000,000 in fully paid £1 shares. The " vested interests " have " tied up " the Victoria Falls until 1981!

Turn for a moment now to the other side of the picture. Mr. Leo Weinthal, editor of the *African World*, wrote in that paper a week or two ago of his recent visit to Niagara, and said:—Africa—as explained before and as admitted by all who have been privileged to see both the Niagara and the Zambesia Falls—has the greater power provided by Nature, a power waiting to be harnessed. America has the greater population, and already existing greater home demand for the products of this marvellous combination of Nature's elementary force and human knowledge as applied in its harnessing. In the next decades, Africa is destined to play a great *rôle* as one of the chief food and fuel producers in the world. The Zambesi Valley has already been proved to contain every element for being probably the most important African area and factor from both these aspects. . . . Again I would ask those in authority to act—to lose no time in applying the practical experiences and lessons gained at Niagara Falls since 1910 to the problem of the Victoria Falls of the Zambesi. The solution of that problem will to a large extent form a great part of bringing the prosperous industrial development of the whole of Southern Africa to a head within our own times."

The Americans would not waste much time in bringing about an era of " prosperous industrial development " in South Africa.

There are men in this country to-day who could Americanise South Africa if only they were given the chance to do so. South Africa is not without men of practical foresight, brains, and perseverance. We have our latent leaders. But as we remarked in our issue of a fortnight ago, we must search for leaders outside the mediocrity of our present politics and beyond the portals of the great Mining Corporations.

Catalogues for Madagascar.

H.M. Consul at Antananarivo has recently written suggesting that it would be of great assistance to the Consulate in its efforts to promote trade between Madagascar and the United Kingdom if he could be supplied with British firms' catalogues of interest to local importers. Catalogues (preferably in French) should be addressed direct to His Majesty's Consul, British Consulate, Antananarivo. They can be sent to Madagascar as printed paper, the rates for which are ½d. per 2 oz. Packets must be left open at the ends.

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The Land Without a Leader.

A FEW OPINIONS.

A Tribute from Kimberley—" Your admirably outspoken . . . article."

To the Editor, *S.A. Mining and Engineering Journal.*

Dear Sir,—I have read with great pleasure, and profit, I hope, your admirably outspoken, clever and pointed article in the issue of your journal of the 2nd inst. Every word of it is to the point and perfectly true, and it is to be hoped that it will reach the right quarter and bear fruit of advantage to both the present and future of this extremely rich and fertile country.

You most truly and ably voice the present crying need of the country in the words with which you close your article. We certainly do need such men as you picture there, and, as you say, " a man who will think beyond the Limpopo."

To my mind, if I may venture to say so to you, the idea of immigration and settlement—a vital necessity to the future of South Africa, in fact for the whole country—must be associated closely with stability. This stability can only be attained in one way, and that is the establishment of a Government Department of Irrigation and Railways. Irrigation is in itself useless if undertaken in spasmodic efforts and widely separated localities; and utterly wasteful of both time and money, unless accompanied by railway construction. This truth is in evidence in many cases at present (notably Douglas, where a fine furrow has been constructed and much splendid land put under water, but no means given to the settlers there of getting their produce away to the markets of the country), and attention must be drawn earnestly to the great necessity for associating the railways with irrigation.

It is of no use to say " It can't be done," to quote yourself, or " I don't know what to do." The Government have got to put a scheme of irrigation and railways before the country, involving an amount of two or three hundred millions of money. Then let the Department take the country as a whole, select suitable tracts of land, survey and plan same, and go ahead with their irrigation schemes, but *with railways*, so that the settlers can get to work with the certainty of being able to send their products to the best markets by way of said railways. The whole of the money need not be borrowed at once, but as it is required. This would spell real stability, and immigration would then be a huge success, and money would flow into this country for development purposes in millions.

If too, the suggestion of State-controlled premium bonds were to become a practical thing, I agree with you that a million a month could easily be raised for the State.

Trusting I have not taken up too much of your valuable time, and thanking you for your splendid article,—I am, yours faithfully,

A. W. WEATHERBY.

Kimberley.

* * *

A Big Industrialist's Appreciation.

To the Editor, *S.A. Mining and Engineering Journal.*

" Your arguments are very clearly set forth and there is a good deal of truth about all you say, especially as regards those who are at the head of the mining houses to-day. They are excellent office men, and write reports to beat the band, but they lack imagination and originality because they are swamped by a mass of office detail, interviews, and so on. They have no time to think, and certainly still less time to gather at first hand throughout the country the information necessary to enable them to evolve a policy suitable to the country. In fact, they are out of touch with the " man in the street," and he is the chap that counts nowadays.—Yours, etc.,

" The Silence of the Press."

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—Allow me to congratulate you on your bold and fearless article in your issue of July 2nd, under the heading of " The Land Without a Leader." It seems to me you have absolutely hit the nail on the head. Most people have been thinking along these lines for a long time past, but your's is the first paper to make the matter clear and to publish it so that the whole countryside may read it.

Another thing we want in this country, Mr. Editor, is a progressive and independent Press. Your's is the only paper that has had the pluck to say what most people know. I notice that several papers have commented at length on your views. The *Natal Advertiser*—more power to its elbow—devotes whole columns to your article. But the big Johannesburg dailies are silent. Why? Everybody knows. But they are foolish to ignore such an article as your's. Again thanking you for the service you have rendered this country.—I am, truly yours,

E. G. T.

* * *

An Old Prospector's View.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—Being an old prospector I have read with great interest your articles and letters (and particularly " The Land Without a Leader ") in your recent publications re prospecting. I can safely say that Rhodesia is miles ahead of the Transvaal in its mining laws, etc., ; in fact, there is no comparison. During my trips prospecting in the Low Country, Pilgrims' Rest, the Northern Transvaal, etc., I found out that there were very few spots where a man could prospect, the whole country being held by big companies, who, if you did find anything, gave you no encouragement whatever.

In Rhodesia the whole country, barring a few patches, is open to the prospector. I have also worked stream tin and alluvial gold in Australia.—I am, yours faithfully,

" WEGDRAAI."

Johannesburg.

* * *

From a Mining Engineer.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—I have read with pleasure your article entitled " The Land Without a Leader," and I beg respectfully to offer you my congratulations on having the courage to say what hundreds, if not thousands, of others in the Union think. Still, one must not expect others to speak out freely, and by so doing " quarrel with their bread and cheese."

GOVERNMENT EXAMINATIONS.

METAL MANAGERS EXAM : Last examination (May, 1921), **15** Metal Certificates were granted in South Africa, and of this number our students secured **10** certificates. Previous examination we secured **7** certificates from **8** entries, and in two other recent examinations **15** passes from **19** entries.

REMARKABLE AND CONSISTENT RESULTS.

COAL MANAGERS EXAM. : Last examination (May, 1921), we secured **3** certificates from **6** entries.

OVERSEAS EXAM : **21** certificates secured 1920, and **14** certificates to date, 1921.

SURVEY EXAM : We have secured practically **all** the certificates granted by the **Mines Department** during recent years and have obtained **60** certificates to date.

CORRESPONDENCE TUITION WHERE PERSONAL INSTRUCTION IS IMPOSSIBLE

WRITE FOR PARTICULARS AND CLASS TIME TABLE.

C. D. LUCAS & B. E. WOLFE,

MINING ENGINEERS,

LECTURE ROOMS, PERMANENT BUILDINGS

Postal Address : Box 6301

On a great portion of your article I can express no opinion, for I am only a visitor to the Union, but with reference to what you say about the mining laws and mining regulations of the Transvaal I am qualified to offer an opinion, for I am a mining engineer of considerable experience in many countries. Since I have been in the Transvaal I have seen several sound mining propositions which, if in the Cape Province, would yield a satisfactory return to the investor, but I shall be unable, on my return shortly to Europe, to recommend my friends to speculate in a mining proposition which, if worked under the mining laws and mining regulations of the Transvaal would probably be done at a loss. Speculators at the present time are entitled to something more attractive.—I have the honour to be, sir, your obedient servant,

A VISITING MINING ENGINEER.

Johannesburg.

* * * *

What America Would Do.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—The article appearing in your issue of July 2nd has set me and many other people thinking. I heartily agree with every word you say. I personally would like to see American capitalists in possession of South Africa. In ten years' time you would not know this country. For the Yank is a pushful fellow, not bound down by red tape or the view that you mustn't be able to see the smoke of your neighbour's chimney. And if American capital got going in this country we should very quickly see huge irrigation works all over South Africa, new railways being built, and mines being opened up. That, at any rate, is my view.—I am, yours, etc.,

PLOUGHMAN.

Rustenburg.

Shale Oil.

The remarks on shale of the President of the Colorado School of Mines—which has an international reputation as a centre of oil shale research—are of exceptional interest at this juncture. In his opinion the world's present dependence upon supplies of well oil is most hazardous, and sooner or later the world-wide deposits of oil shale must form the raw material from which we shall obtain our oil. This Mr. Victor C. Alderson, the President, considers will occur in the lifetime of the average middle-aged man of to-day. He anticipates that the oil shale industry will be established in a score or more of countries, as such deposits are as widely distributed as free oil—from Norway to New South Wales, from South Africa to Chile, and from Bulgaria to California. It is the treatment of the shales that is the chief problem besetting the extension of the industry, the greatly varying character of the shales necessitating correspondingly varied processes. Mr. Alderson's prophecy of the virtual exhaustion of the well oil in a score of years or so appears a little bold. It is certain that an enormous amount of new drilling will be required to maintain supplies commensurate with probable world demand, but estimates of the lives of oilfields are at the best practically guesswork and the question of comparative costs of well oil and shale oil is still an uncertain factor. This Mr. Alderson dismisses airily: "The cost? The world will need it and must have it, regardless of cost"—a statement that seems to ignore the fact that oil is a competitive fuel, and that a large part of the petrol consumption of the world is based on a luxury or semi-luxury employment of the commodity in private cars.

The London Stock Exchange on Tuesday was inactive. Kaffirs were better on the rise in price of gold. Diamond shares strengthened on advices from Amsterdam stating that the position in the diamond trade is more encouraging.

Closing middle prices:—

Consols	£47	17	6
War Loan	88	3	9
De Beers (Defs.)	10	17	6
Jagersfontein	2	7	6
Central Minings	6	7	6
City Deeps	2	8	1½
Con. Langlaagtes	0	12	6
Crown Mines	1	17	6
East Rand Props.	0	4	9
Gedulds	2	10	7½
Union Corporations	0	15	4½
Government Areas	4	2	6
Johnnies	1	4	3
Modderfonteins	3	12	6
Modder B's	1	10	0
Modder Deeps	2	6	3
Randfonteins	0	14	6
Rand Mines	2	5	7½
Transvaal Lands	3	17	6

On the London Metal Exchange standard copper closed at £72 1s. 3d. cash and £72 1s. 3d. forward; electrolytic copper at £76 10s. cash and £77 10s. forward; Straits tin at £166 7s. 6d. cash and £168 7s. 6d. forward; English lead at £23 2s. 6d. cash and £25 forward; bar silver at 37d., and fine gold at 113s. 4d.

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The June Output in Detail.

In June the Transvaal gold mines produced 678,490 ozs. of fine gold compared with 687,776 in May, a decrease of 9,286 ozs. The value of the June output, however, is £79,046 greater than that for May, owing to the increase in the gold premium. In May the gold was valued at £5 3s. 9d. per ounce, while the figure for June was £5 7s. 6d., an increase of 3s. 9d. per ounce.

The Leading Figures.

Appended are the output totals for June compared with those for the previous month:—

Witwatersrand.

	Ounces.
May	671,750
June	663,383
Decrease	8,367

Outside Districts.

	Ounces.
May	16,026
June	15,107
Decrease	919

Grand Total.

	Ounces.
May	687,776
June	678,490
Decrease	9,286

Native Labour.

The number of natives employed on the Transvaal gold mines at the end of June was 168,152, as against 170,595—a loss of 2,443 boys. The totals for the past three months are:—

	April.	May.	June.
On gold mines	172,826	170,595	168,152
On coal mines	14,908	14,510	14,704
On diamond mines	1,316	1,302	1,317
	189,050	186,407	184,173

Individual Returns.

	Ounces.	Increase	Decrease.
Aurora West	2,875	--	140
Brakpan Mines	20,971	-	1,824
City Deep	36,128	—	1,123
Cons. Main Reef	16,866	—	818
Cons. Langlaagte	12,633	51	—
Crown Mines	54,461	1,113	
Durban Deep	9,195	—	443
E.R.P.M.	33,034	—	2,824
Ferreira Deep	10,620	-	347
Geduld Prop.	14,815	—	971
Geldenhuis Deep	12,423	—	817
Govt. Areas	51,266	—	2,716
Knight Central	6,816	—	351
Langlaagte Est.	12,213	—	8
Luipaardsvlei Est.	4,998	342	—
Modder B.	32,556	—	382
Modder Deep	23,884	651	—
Modder East	9,753	—	600
Meyer & Charlton	7,776	—	492
New Goch	3,800	--	174
New Kleinfontein	13,795	450	—
New Modder	45,103	1,414	—
Nourse Mines	13,561	—	438
New Primrose	4,431	—	62
New Unified	2,525	—	20
Randfontein	37,475	2,048	—
Rood. U.M.R.	4,628	118	—
Robinson	7,905	—	130
Robinson Deep	17,404	—	744
Rose Deep	13,876	171	—
Simmer and Jack	14,136	-	481
Springs Mines	18,806	—	790
Van Ryn Estate	9,440	—	57
Village Deep	15,212	71	—
Van Ryn Deep	26,889	625	—
West Rand Cons	9,259	—	249
Wolhuter	7,842	-	128
Witwatersrand	10,046	708	—
Wit. Deep	9,513	—	55
Miscellaneous		1,055	

Outside Districts.

	Ounces.	Increase	Decrease.
Transvaal G.M.E.	4,387		441
Sub Nigel	5,698	-	217
Glynn's Lyden.	1,450	98	
Miscellaneous	3,572		359

On a South African Gold Mine.

Group Profits.

	April.	May.	June.
Central Mining	£362,448	£392,456	£427,557
Barnato	261,506	250,900	281,801
Gold Fields	31,556	34,855	38,035
General Mining	34,830	36,174	40,518
Mines Selection	69,749	76,807	76,925
Union Corporation	96,707	99,118	106,642
Totals	£856,796	£890,210	£971,478

Monthly Output Totals.

	Ounces.	Value.
January	651,593	£3,420,863
February	558,137	2,895,336
March	671,123	3,481,450
April	681,382	3,534,669
May	687,776	3,567,838
June	678,490	3,646,884

De Beers Dividends.

In our recent list of dividends for the half-year ended June 30th, we gave a De Beers declaration of 10s. per share on the deferred as well as on preferreds. This is incorrect, as the only dividend declared was one of 10s. on the preferred shares. This made the 40 per cent. for the year to which the preference shares are entitled before any distribution can be made on the deferred. The last dividend on the deferred shares was 20 per cent., paid in January last.

Ventilation of Deep Coal Mines.

DIFFERENCE BETWEEN CONDITIONS IN BRITAIN AND SOUTH AFRICA.

At the London meeting of the Institution of Mining Engineers, held on June 9th, 1921, great interest was shown in the third report of the committee on "The control of atmospheric conditions in hot and deep mines," which was read and amplified by Mr. J. P. Rees. Mr. Rees prepared the report for the committee and was responsible for most of the observations.

The pits in which the investigations were carried out were selected on account of their depth and because of specially adverse circumstances which made temperature control difficult. The Doncaster Coal Owners' Laboratory was used as a base of operations. It was desired to find out the operation of the causes leading to high underground temperatures, and particularly to high wet-bulb temperatures.

The three causes of rise of temperature in underground workings are the heating due to the compression of the air as it descends the shafts or inclines, which in Britain amounts to 5.5 deg. Fah. per 1,000 feet depth; to the conduction of heat from the surrounding strata; and to the heat generated by the oxidation of coal, other minerals and timber. The increase in moisture is due to evaporation of water percolating through the walls and shafts or contained in the freshly exposed coal. Men, horses and lamps have very little effect on mine heat or moisture. The shaft and road walls have an averaging effect on temperature, in exceptionally warm weather even taking up heat from the air.

Heating by conduction may be reduced to a minimum by passing sufficient air through the shafts and roads, as the flow of heat through rock is comparatively slow.

In Britain the rate of increase of the natural rock temperature with the depth is always much greater than the increase of air temperature from compression, the rate in the collieries investigated being about 1 deg. Fah. increase in rock temperatures per 60 to 70 feet depth, and 1 deg. Fah. increase in air temperature due to compression per 182 feet depth. In the Witwatersrand district of South Africa on the other hand, the rock temperature increase is only about 1 deg. Fah. per 250 feet depth, so that if a deep mine were dry, abundant ventilation would warm it, in contrast to the cooling effect it has in Britain.

Air moisture increase can also be effectively controlled by ventilation, until the working face is reached. Even in a very wet colliery, with abundant ventilation, the cooling effect of evaporation would tend to keep the road temperature low, and thus indirectly control the air moisture and the wet-bulb temperature. The great increase in air-moisture content at the working face when air passes over fresh and relatively moist coal was shown by the investigation.

The observations were made by means of a special type of whirling hygrometer. The details of the investigations from which the report of the committee has been drawn up were fully described by Mr. Rees and will appear later in the Proceedings of the Institution.

Another equally interesting paper to coal miners was read by Professor Henry Briggs, D.Sc., on the "Characteristics of Outbursts of Gas in Mines." In this paper Professor Briggs dealt with some of the more important gas outbursts which have occurred in many countries, particulaly in France and Belgium, Silesia, Canada and Britain, and described in detail some special investigations which he has made in connection with two recent outbreaks which have occurred at Porthenry in South Wales.

The first of the two Porthenry outbursts blew out or displaced 280 tons of coal, with a volume of about 7,200 cubic feet in situ. Much larger outbursts have occurred in other parts of the world, of which the chief were the one in Gard in 1908, when 4,000 tons of coal were moved, and the one in British Columbia in 1904, when 3,500 tons were displaced. In 1879, in a Belgium outburst, 121 lives were lost.

The Porthenry outburst occurred after driving through a "want," and upon entering the thickened seam bordering the want. The seam is of anthracite, and normally consists of two portions, top coal 6 inches thick and bottom coal 32 inches thick. The depth below ground was 900 feet. A slant had been driven with a gradient of 6 inches per yard, and the top coal was found to be continuous and unaffected, but the bottom coal was absent in the slant.

When a heading was turned off to explore the extent of the want, it immediately encountered the bottom coal, in a very friable condition. The face had reached 22 yards from the slant when the outburst took place. A large quantity of gas was discharged, 170 tons of fine coal were shot out into the heading and slant, and a further 110 tons were disturbed inside the original face of the heading. The ejected material was found, during removal, to be warm. A thermometer inserted in the heap 3 feet in front of the workmen registered up to 138 deg. Fah. The heating appears to be due to oxidation.

A Scene on the Natal Coalfields.

Practically all outbursts of gas from the solid have occurred when driving winning headings or "when working on the whole" in bord-and-pillar mines. Experience has shown that it is safest to work advancing longwall in mines subject to these outbursts, and to avoid pushing forward the faces too quickly. A wide straight face advancing slowly gives the gas a chance to drain away. Hand cutting also seems to be safer than machine cutting as far as this particular risk is concerned. Boring in advance is also resorted to, to help the gas to get away.

The coal ejected from these outbursts is dry. The absorptive power of coal is greatly reduced by damp, so that outbursts need not be feared where water exudes from the face with the gas. When water, however, enters a virgin seam for the first time where gas has been absorbed under pressure, gas may be evolved, and if unable to escape, may cause a burst.

In conclusion Dr. Briggs showed that outbursts of gas and coal from the solid are due to the co-existence of four factors, the presence of gas under a considerable pressure; the presence of a mass of disintegrated coal loose enough to be moved and to set free the gas absorbed in it; the absence of water in the soft coal; and the employment of a method of working which does not allow the gas to easily escape. The presence of impervious ribs surrounding the soft coal would have the same effect as the last-mentioned factor

War Against Accidents and Miners' Phthisis.

LECTURES ON THE MINES.

Mr. A. M. Anderson, Ambulance Organiser to the Prevention of Accidents Committee of the Rand Mutual, who is at present going round the mines preaching the gospel of "Safety," has delivered two further lectures on the Safety First Movement at the Consolidated Main Reef on the 30th ultimo and at the Government Gold Mining Areas on the 7th instant.

The lecturer briefly outlined the two aspects of safety, viz., the prevention of accidents and the alleviation of pain and suffering following an accident; he illustrated both with striking cases of negligence which had come to his notice and which have unfortunately cost their victims loss of lives or limbs. He also instanced cases where prompt and efficient first aid has been the means of saving limbs which otherwise would have been lost, and drew attention to the alarming increase in accidents which have occurred during the last few months. The lecturer made a special appeal to shift bosses and shop foremen to assist in the movement as their co-operation was especially essential. He fully realised the calls for increased output that were made upon them, and reminded them of their more serious responsibility, namely that of looking after the safety and welfare of the workers placed in their charge.

There was a large audience at the Consolidated Main Reef Mine, at which Mr. J. Thorp, acting general manager, presided. Mr. Thorp urged the men to maintain the safety habit unabated, and warned them that a moment's carelessness may have very costly consequences. He caused no little amusement by illustrating this with his own experience. For 364 days he had religiously shut the gate of his garden, on the 365th day he thoughtlessly forgot, thus allowing a cow to polish off all the carnations in his garden.

Mr. Charles Marx, jun., general manager, presided at the lecture at the Government Areas, which was also well attended. Mr. Marx made a special appeal to the ladies to assist in the movement by imbuing the breadwinner at home with the "Safety First" spirit. The experience on his mine proved clearly that the majority of accidents can, with but little care, be prevented.

Both lectures were preceded by the Safety First cinema film, depicting some of the ways in which accidents occur underground, and by the "Dust that Kills" film, illustrating the various possible causes of miners' phthisis and the measures employed to counteract them and to ameliorate the condition of the sufferers from the disease.

A similar lecture is being delivered at the City Deep mine on the 27th instant, and it is hoped that other mines will follow the example of these mines and arrange for similar functions to take place at an early date.

JUNE COMPANY REGISTRATIONS.

The following new companies were registered in the Transvaal during the month of June. They are private companies, with the exception of the Station Colliery, Ltd.:—Shannon Mica Co., Ltd., capital, £3,000; Witbank Carlton, Ltd., £3,000; The City Hardwood Co., Ltd., £1,000; Zuid Afrikaanse Hollandse Apoteken Beperkt, £5,404; Allenwest Brookhirst (South Africa), Ltd., £20,000; Amersfoort Motor Co., Ltd., £6,000; S. G. Williams, Ltd., £5,000; Station Colliery, Ltd., £60,000; Vyfontein Concrete Co., Ltd., £3,000; Universal Agencies, Ltd., £5; N. Jacobs & Co., Ltd., £10,000; Netherlands Cheese Manufacturing Co. and Creameries, Ltd., £5,000; Klerksdorp Gold Recovery, Ltd., £1,000; B. I. Foote, Ltd., £5,000; Transvaal Carbonic Acid Gas Works, Ltd., £10,000; J. A. Jones & Co., Ltd., £30,000; United States (Africa) Import and Export Co., Ltd., £2,000; Longpan Salt Co., Ltd., £100; E. Dusting & Co., Ltd., £3,000.

Spontaneous Combustion and South African Coal.

FIRES IN BRITISH SHIPS.

The British Board of Trade has had a report and analysis made of the fires on British ships. One hundred and fourteen cases were investigated, and reports made on all cases that occurred between August, 1919, and July 31st, 1920. The list of cases described as being due to "spontaneous combustion" is as follows. It will be seen that Natal and Transvaal coal figures in comparatively few cases, and we print the complete list because it serves to remove the wholly erroneous impression that South African coals are more prone than others to cause spontaneous combustion. It will be seen that out of 71 ships set on fire by this cause only seven were using Transvaal or Natal coal. Of these seven two were described as Transvaal, one as South African, and the remainder as Natal:—

Anglesea (Yorkshire); Arabian Prince (probably American); Ashanti (American); Australind (American); Australind (Natal); Bassano (shipped in Japan); Bewick Castle (South African); Boonah (Yorkshire); Brodvale (Yorkshire); Buckleigh (Welsh); Burmese Prince (American, shipped at New York); Cap Verde (Yorkshire); City of Rangoon (American and Yorkshire); City of Winchester (American); Clan Mackintosh (Transvaal); Clan Macmillan (Scotch, Indian and Transvaal); Clan Macvicar (Scotch and Bengal); Clan Skene (Cape Breton, Yorkshire and Durham); Cordoba (German and Welsh); Cressington Court (Durham); Danier (Tyne); Eastwood (American, Berwind); Edmund Hugo Stinnes 4. (Welsh); Egremont Castle (American, New York); Fernfield; Gasconier (Yorkshire); Gledhow (Durham); Hakan (Tyne); Haliartus (Northumberland); Hannington Court; Highland Heather (Welsh); Hilarus (Welsh); Hilston (American); Kamenitz-Podolsk (Australian); Kandahar (American); Karamea (Durham); Konig Friedrich August (Bengal, mixed); Laristan (Welsh); Lubeck (American); Luneberg (Various ports); Manchurian Prince; Mineric (American); Nembe (American); Norman Prince (Welsh); North Point (Indian and Colonial); Oakfield (Tyne, unscreened); Plauen (Welsh); Port Elliott (American, New York); Port Macquarie (Newcastle, N.S.W.); Prinz Hubertus; Queen Alexandra (American); Queen Helena (North Country and Welsh); Queen Margaret (Welsh); Reath (American); Rudelsburg (American, New York); Shropshire; Siberian Prince (American, Berwind, White's "Eureka"); Stephen (Durham); Strathearn (British); Sydney (shipped in Australia, Java and Calcutta); Syria; Tennyson (American bituminous); Tropic (American); Tudor Prince (Lancashire and Welsh); Twilight; Waddon (Welsh); War Halifax (Canadian and Welsh); War Noble (Natal); War Soldier (Natal); Wasa (Welsh); Waziristan (Durham); York Castle (Natal, mixed).

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EDITORIAL.

THE FINANCIAL OUTLOOK.

The lugubrious speeches made by Mr. Burton and Mr. Jagger in the Assembly this week have again drawn attention to the finances of the Union. The figures quoted by both Ministers certainly point to falling imports and a general restriction in trade and enterprise. These last are undoubtedly realities, but no more, we believe, than might reasonably be expected to follow the curtailment of credit that marked the beginning of the present year. As a fact, there is good ground for stating that the process of deflation and readjustment now in evidence is wholly healthy and sound. It means that trade has taken stock of the position, and has begun seriously to set its house in order. The same painful process has, of course, been at work in almost every other country, and, next to America, we in South Africa are, perhaps, feeling the pinch least of all. It is noteworthy that importations of merchandise, which amounted to about £54,500,000 during the last six months of 1920, have been on a much more moderate scale, and averaged approximately £5,500,000 a month for the first four months of the current year. It is generally agreed that a large proportion of the 1920 imports represented goods ordered some time previously at high prices, and those have been difficult to sell profitably under the altered conditions of the past few months. Although prices have been cut, it is believed that further reductions will be necessary in sympathy with the continued decline in wholesale prices in the world's markets. It appears from the latest authoritative figures available that the summit of high prices was reached in the early part of last year, since when there has been a steady decline. Retail prices are said to be falling, though more slowly than the fall in wholesale values. These facts are, of course, in accordance with the figures quoted in the Assembly this week, and, knowing them, we cannot pretend to be surprised at the drop in customs, railway and general revenue. A big point made by the critics of the Government appears to have been the stoppage of development work, involving a cessation of capital expenditure. That, we understand, is merely temporary. The Prime Minister's visit to London is thought to have as one of its objects the raising of a substantial loan for public works in the Union; and everything points, at the moment, to General Smuts receiving the most favourable reception in the London money market. Incidentally, it may be noted that there are rumours that globular sums of American capital may be invested in this country. The visit, doubtless, of representatives of some of the biggest financial interests in the States to South Africa is doubtless at the root of these reports, and we have no means of knowing the exact facts. A Capetown contemporary, jumping at conclusions, declares that Mr. I. Schlesinger has gone to America to raise twenty millions for the Union Government. Our recent eulogy of that gentleman does not go as far as to enable us to give credence to that report. At any rate, more money is sadly needed for the development of the manifold resources of the country, and there is every reason to believe that General Smuts, if he really exerts his influence, can command it in London, even in these days of high monetary rates and general financial stringency.

OUR SECOND SPECIAL COAL NUMBER.

We wish to take the opportunity of reminding our readers of the forthcoming issue of our Second Special Coal Number. The issue is now in active preparation, and will be published about the end of this month. Owing to the large amount of work entailed, it is not yet possible to fix the exact date of publication, but readers will be notified thereof in our columns. As on the last occasion, the volume will be entirely separate from the usual weekly issue of this journal. The price has been fixed at 2s., and orders may now be booked in advance at this office, or at our London office.

In this second Special Coal Number we endeavour to review the history, present status and future outlook of the Coal Industry of the Sub-continent, and especially do we attempt briefly to chronicle the various events which have happened in South Africa's dominion of King Coal since the publication of the first Coal Number a year and a half ago.

In the present issue the broader aspects of this coal branch of the Mineral Industry in South Africa are, after a brief account of its history, first dealt with. Coal is a commodity extremely susceptible to trade fluctuations. It is the basis and key industry of all other industries.

We have accordingly devoted some space to the coal statistics of other portions of the world, to costs of production and sales prices in Europe and America, to the calamitous strike of miners in the British Isles, which has had its lessons for and effects on South Africa, and to the resources of countries which were more greatly favoured by the carboniferous epoch than was South Africa, but which possess great disadvantages in the cost of production when compared with the Union.

The latest estimates as to the coal reserves of the four Provinces of South Africa and their roughly classified values are given, and in this issue, too, the coal resources of Rhodesia are appraised as accurately as existing and admittedly inaccurate estimates will allow.

We deal also with the question of utilising low-grade coal, which has been, and still is being, scandalously wasted in South Africa. We show what is being done in other countries to conserve this national asset, and make it clear that it is high time the Government and Coalowners should combine to do something tangible which will at least arrest the growth of those dumps which bestrew the high veld and which are a lasting disgrace to the business brains of the country. We deal with the subject of bituminous by-product plants, with coal mining, machinery, and lay-outs, washing plants and equipments. Photographs of coal mines, of Railways and Harbours equipment designed for the coal trade, and of prominent coal and colliery officials, diagrams and maps of the coal fields, a useful summary of collieries, showing their situations in regard to railway stations, and various other features will, we hope and believe, render, in the public estimate, this Second Coal Number a worthy successor of the first and pioneer number, which portrayed the essential features of the Coal Industry of South Africa.

THE BOARD OF TRADE AND INDUSTRIES.

The nearest approach to constructive statesmanship made by the Government in the present session is certainly the formation of the Board of Trade and Industries, particulars of which appear elsewhere in this issue.

Mr. Malan's speech, in announcing the personnel and functions of the new Board, showed a real and sincere desire to help local industries in their nascent stage. Indeed, the new Board would seem to be in reality an industries development organisation. It is to leave science to the Scientific and Industrial Advisory Board, and questions of high principle, notably, protection v. free trade, to the Government itself. The terms of reference, said the Minister, are very comprehensive, and the basic principle in them is the development of industries. In constituting this board the Government definitely accepted the principle that industries were necessary for the development of the country, and they definitely adopted the policy of working up the raw materials in the country. Mr. Malan added, "We are not out for a policy of protection at any price. We must be reasonable and we must bear the consumer in mind. We must work on a basis of reason and common sense, and if we do that the difficulties will disappear. But in coming to any conclusions you must look at the issues from the point of view of the manufacturer and of the consumer also."

Mr. Malan went on to emphasise the practical nature of the Board's work. Its decisions would have to be unanimous; in other words, there must be no minority reports. He also explained that the board would take over much of the purely trade work that had devolved upon the Customs Department since the war. This, of course, is but a minor side of the board's work. Its chief use and function is to develop industries on their individual merits, and regarded as separate economic units. There is only one criticism we have to offer in regard to this excellent intention. It concerns the actual business value of the board's endorsement of an industrial scheme. What new industries want most of all is, generally, capital. Will the board's approval of a scheme's aim and conception help promoters to secure that great desideratum? There is no indication in Mr. Malan's speech that it will. We all know the case at our very doors of the Pretoria iron and steel industry, which, though it has had every possible encouragement from the Government, is still awaiting the capital necessary to realise its full possibilities. Mr. Malan's new board is a welcome measure as far as it goes, but it still neglects to provide any machinery to furnish the capital which is the sinews of industry. In so much as it fails in this all-important respect its practical value to local industries is, therefore, sadly deficient.

Notes & News.

Central Rand Pegging.

During the past fortnight something of a mild sensation was created by the pegging of a large block of claims on the Central Rand some distance south of the dip of the Main Reef Series. One of the overlying reefs of the Rand, opened up on the claims in question, is said to have given high values. and, further details will be awaited with interest.

* * * *

Back Numbers Wanted.

A leading enquiry firm is anxious to obtain certain back numbers of this journal issued during 1913, 1914, 1915, 1916, and 1917. They are quite prepared to pay any reasonable price for any back numbers purchased, provided they are intact. Will anyone willing to dispose of their back numbers kindly communicate with the Business Manager of this journal.

* * * *

Henderson's Options.

In a letter to the London financial papers, Messrs. Henderson's Transvaal Estates, Ltd., write in regard to the once-popular Henderson Options: "Most of the holders of these are aware that the options should expire on a date which is to be twelve months after the declaration of peace, and this date has not yet been officially announced, but it will probably be July or August of this year. Hence the options will remain in force for a little over a year from now. In view of widespread financial depression, and the present low price, it appears desirable in the interests of shareholders for the options to be extended, and a suggestion has been made to the company that the options be extended until March 31, 1923. Will shareholders and option-holders who are in favour of this please notify the company immediately to that effect." The reference to the official declaration of peace is obscure to us in the Colonies, who are under the impression that the official declaration of Peace was some time back.

* * * *

Silica and Phthisis.

The belief that the addition of other dust to the dust made in our gold mines will prevent miners' phthisis has been denied by an American investigator. At a recent meeting of the American Institute of Mining and Metallurgical Engineers, Dr. H. M. Landis, in speaking of the potter's phthisis, said that the potter inhales clay dust in which there is a small amount of silica, and that in the course of years the potter's lungs get into the unsatisfactory state associated with silicosis. The conclusion is that silica is always the cause of the trouble, and that admixture with clay and similar harmless minerals tends to postpone the evil day. Thus the addition of other mineral dust to the mine air is only a palliative and not a certain prophylactic.

* * * *

New Reef Struck.

It has been known for some time (says the *Krugersdorp Standard*) that developments of an important nature have been maturing in the Krugersdorp mining district, on the Main Reef covering a large area. News of a very interesting strike of the long-lost Buckshot Leader of the Rietfontein series of reefs on the Northern anticline of the Rand beds in the lower Rand strata on the farm "Zwartkop," about twelve miles north of Krugersdorp, has also been brought in by Mr. E. Kumst, consulting engineer of the Western Main Reef, Limited, and have been reported at the Government offices here. Apart from this, it is further claimed that the important discovery of a new goldfield on the north of the Rand, overlying the granite boss, has been traced for a distance of approximately 65 miles, by the Western Main Reef Company, which has acquired the mining rights over a considerable area on the line of strike. We are informed that very high values have been obtained from tests made. Shaft sinking on the Reef is being actively prosecuted by the Company on the town lands of Krugersdorp.

A Board of Trade and Industries.

The new Board of Trade and Industries is dealt with elsewhere in our editorial columns. Its objects are officially explained as follows:—(a) To hear and examine complaints and recommendations which may be made as to the working of the Customs and Excise tariffs; (b) to advise the Government in regard to (1) the recasting of the customs tariff and the adjustment of anomalies which may from time to time occur in these tariffs, (2) such action as may be necessary or advisable for assisting and developing the industries of the Union, and (3) such other matters as the Government may refer to the Board for its consideration and advice. It is further notified that the following have been appointed members of this Board of Trade for a period of three years as from date: Sir Edmond Howard Lacam Gorges, K.C.M.G., M.V.O. (as chairman), William Arthur Caldecott, Henry Eardley Stephen Freemantle, M.A., Walter Marshall, Johannes Adriaan Neser, and J. P. William Fleming McMullen, of the Industries Division of the Department of Mines and Industries, as secretary.

The following have been appointed assessors to the Board: Hendrik Johannes van der Bijl, M.A., Ph.D., scientific and technical adviser to the Industries Division of the Department of Mines and Industries; Gilbert Owen Smith, Commissioner of Customs and Excise, William James Kinlay Skillicorn, Assistant General Manager's staff, Railways and Harbours Administration. The powers and personnel of the Board are, of course, excellent, as far as they go:

* * * *

The "Western Main Reef."

In the issue of this journal of the 18th June, attention was drawn to the alarming future facing the gold mining industry, unless working costs were reduced, efficiency increased, and new reefs were exploited.

Subsequently attention was drawn to a new company, the Western Main Reef, Limited, which has been formed with a nominal capital of £1,000,000. Among the extensive holdings of this company are large areas on the granite boss which lies to the north of the Central Rand, between the Witwatersrand and the mountain ranges to the south and south-west of Pretoria. It is said that a series of quartz veins, some of which are true fissure veins, can be traced in the gneiss and schists near the contact with the granite, almost right round the boss, and that they carry, in addition to other minerals, gold, silver, and copper.

It is claimed by the promoters of this venture "that should even the whole Main Reef workings be shut down, it would provide an avenue of employment for the whole of those thrown out of work. Now, were the Rand not confronted with the spectre of unemployment and ruin, these proposals would be worthy of consideration and support." This formation is said to be similar to certain well-known goldfields of California and Colorado.

Some years ago, Mr. J. F. van der Velde did a considerable amount of work on farms on this formation, and the following is extracted from a statement he has made on the subject:—

He put down a shaft at a depth of some 30 feet, following a reef which gradually widened to 2 ft. 9 in., carrying values of 8 oz. over all. Going in a westerly direction, he opened up the same reef on a portion of the farm Waterfall, and there in trenching obtained values of 15 dwt. over a width of 3 ft. 6 in. On the other side of a hill, he discovered the reef in trenches, and by trenching obtained values of 2 oz.; working further still westward, he got about 17 dwt. at an average width of 3 ft. 6 in. Immediately north they found another big quartz lode striking parallel with this from east to west, obtaining 7 to 8 dwt. over an average width of fully 8 ft.

About this time a well was being sunk in the township of Linden, in which he discovered a true fissure in the Granite, carrying values of 17 dwt. over 2 ft.

This confirmation of the proposition should not, however, divert attention from the rights held by this company over very large areas of the Main Reef Horizon, and to the Buckshot Leader, which it is claimed, has been located on the farm Zwartkop. To further news of the latter we look forward with a considerable degree of interest.

Even if the times did not call clamantly for new exploitations, we should feel justified in wishing such a venture the success that its claims and enterprise deserve.

* * * *

Chamber and Workers.

The latest phase of the discussion between the Chamber of Mines and the S.A. Industrial Federation on the subject of wages on the mines is that the following reply to the Chamber's new proposals has been sent by the executives of the men:—

"With reference to the further communication from the Chamber of Mines to the South African Industrial Federation concerning the above, I may state that the union executives are gratified to know that the previous proposed cut of 3s. per day has been withdrawn. I am directed to point out that the new proposal of the Chamber of Mines merely alters the amount, and the date of its incidence, and does not embody the principle clearly put forward by the representatives of the unions at the last conference with the Chamber of Mines, i.e., that a definite system for the adjustment of wages should be adopted so that the wage-earner will know well in advance what his wages will be at any given date. With a view to the introduction of the foregoing principle the executives request that the following proposal be placed before the Chamber of Mines:—

"1. That 50 per cent. of the £2 8s. and any increases based on the £2 8s. be regarded as not subject to fluctuations in the cost of living.

"2. That the remaining 50 per cent. be accepted as subject to cost of living variations and as equal to 57 per cent. in the cost of living.

"3. That we agree to recommend to the members of the unions acceptance of a reduction or increase of wages (if No. 1 is accepted) of 6d. per day for each decrease or increase of the cost of living by 7½ per cent.

"4. That wages for any quarter shall be based on the cost of living figures of the last but one preceding quarter.

"5. That the first adjustment of wages should be based on the July-September quarter, and in accordance with Clause 4 operate from January 1st, 1922.

"The executives feel strongly that this course should be followed to meet the present wages dispute as well as to avoid future possible disputes about wages.

"The executives are prepared to discuss these proposals in further conference should the Chamber of Mines desire such a discussion."

* * * *

"Shell" Profits.

A a meeting in London of shareholders of the Shell Transport Company, the chairman said the profit for the year was £8,870,000, and a dividend of 35 per cent. would be declared. A proposal to increase the capital by ten millions sterling was sanctioned.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Gold Mining and Metallurgy.

Atmospheric Conditions in Deep Mines.—Colliery Guardian, June 17, p. 1746.

Prospecting.—Mining and Scientific Press, June 11, p. 800.

" Cyanide Notes," by A. del Mar.—Mining and Scientific Press, June 11, p. 810.

" Scheme for Working City Deep " Reply to Discussion by E. H. Clifford.—Bulletin of the I. of M.M., June.

Coal.

Spontaneous Combustion of Coal in Mines.—Colliery Guardian.—June 17, p. 1739.

Underwater Storage of Coal.—Colliery Guardian, June 17, p. 1750.

Modern Development and Underground Equipment. Colliery Guardian, June 17, p. 1751.

Dry Cleaning Coal.—Iron and Coal Trades Review, June 17, p. 819.

World's Production of Coal in 1920.—Mining and Metallurgy, June, p. 22.

Iron and Steel.

Survey of the Position of the Steel and Iron Trades.—Financial News, June 23, p. 152.

Restarting the Iron and Steel Trades -Iron and Coal Trades Review, June 17, p. 823.

Engineering.

Railway Electrification in Central Europe.—Electrical Review, June 17, p. 786.

Electrification of Mines.—Mining and Metallurgy, June, p. 19.

Heat Treatment of Drill Steel.—Mining and Metallurgy, June, p. 35.

Analysis of Drill Steel Tests.—Mining and Metallurgy, June, p. 43.

Recent Improvements in Steam Turbine Design.—The Engineer, June 17, p. 641.

Large Grain Elevators at Sydney, N.S.W.—The Engineer, June 17, p. 649.

Oil.

New Brunswick Oil Shales —Financial News, June 24, p. 159.

African Lead and Vanadium Mines, Ltd.

The consulting engineer of this company submits the following information: The main haulage incline, which has been in the mineralised zone for most of the distance, has now reached the 75 ft. horizon, at which depth the lower vanadinite ore body, exploited in the old vertical shaft workings, has been met with. This incline has connected up with the old workings on the 53 ft. and 73 ft. levels, respectively, which are badly caved and at present inaccessible. As soon as these have been reconditioned, exploratory work on the lead and vanadinite ore bodies will be pushed ahead as rapidly as possible. The recovery of galena from the mineralized matter removed from this incline haulage was low, but as work advanced towards the old vertical shaft workings the lead exposures were more promising. The results so far obtained from experimental work with the diamond pan indicate that this preliminary system of ore treatment should prove effective and economical. An excellent supply of water, sufficient for all requirements, has been met with in No. 2 borehole at a depth of 236 feet. The accommodation for white employees has been completed, and the manager's house is in course of construction

Concerning Mines and Men.

Mr. J. H. Curle passed through Johannesburg this week on his way to the Congo.

* * * *

Mr. Arthur Moline, of the Bendigo goldfields, has been on a brief visit to the Rand.

* * * *

Mr. W. T. Pope, the well-known mining engineer, has been re-visiting the Rand after many years' absence.

* * * *

A strong deputation representing the Transvaal Coal Owners' Association left last week for Capetown, to interview the Government in regard to the recent decisions of the Profiteering Board. The deputation consisted of Messrs. Gordon Sandilands, Panchaud, John Roy, Waldie Pierson, and Tregonning.

* * * *

Mr. Robert Scott, M.B.E., at present Acting Resident Engineer at Sydney-on-Vaal, has accepted a commission from a firm in India to proceed to that country to inspect and report on a mining proposition. Mr. and Mrs. Scott are leaving for India early in August, and expect to be absent from South Africa for about a year. Mr Scott, who is very well known in South African mining circles, has been General Manager of several important diamond mines.

Base Metal Prices.

Latest advices from London are to the effect that all base metal quotations are appreciably harder. A better American demand, and increased inquiries from the Continent, seem the chief reasons. Tin, lead and copper quotations have all firmed up during the week. Silver is also higher because of renewed demand from the East, consequent on the desire of Eastern banks to increase their silver reserves, owing to the failure of the French Industrial Bank of China.

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ENGINEERING SECTION.

The Vaal River Scheme, Rand Water Board.

[By W. Ingham, M.Inst.C.E., M.I.Mech.E.]

PART II.

River Diversion.

Generally the principle adopted was to dam off sections of the river bed by coffer dams commencing at the Transvaal side and working south. Concrete walls were constructed for the upstream side and clay core walls for the cross and down stream walls. The latter walls were cheap and easy to replace, and in large floods were washed away and gave a free way for the silt being carried down the river.

These clay core walls were of two types:—

(1) Two rough stone walls were built up about one foot high with a space of one foot between them, and the space filled with clay and well rammed. This operation was repeated until the desired height was obtained.

(2) Cement bags filled with rubble and earth taking the place of stone walls and clay puddle between them.

Latest View, showing Progress of Superstructure.

The upstream concrete wall was not built continuous, but gaps were left in it, into which concrete slabs six feet wide and two feet three inches deep could be fitted, allowing the gaps to be opened or closed at will, so that in the event of a freshet coming down the river some of the slabs could be taken out, to prevent flooding if concrete work was in progress. To enable work to proceed during freshets cross walls were built at frequent intervals to prevent the flooding of the whole area.

Concrete Work—Apron.

The apron covers the rock bed for the entire length of the Barrage and for a width downstream of 100 feet.

Its purpose is to prevent erosion of the foundations under and downstream of the piers, and for this reason is carried 45 feet beyond the back of the piers. It may be as well to mention that great care should be taken to avoid erosion downstream of a dam or barrage, bearing in mind the costly experience of the Assouan Dam.

The average thickness of the apron is 4 feet, and the concrete mixture was 1—3—6 except for top 6 inches, which was 1—2½—5.

Drains were constructed under the concrete, downstream of the gate cills to prevent any upward pressure on the apron.

Whenever possible the concrete was put in, for the full thickness of the Apron, and one day's concreting varied from 100 to nearly 300 cubic yards. About 25 per cent. of displacers or plums were placed in this concrete.

In order to bring the concrete to a good surface, the shuttering for each day's work was accurately levelled, and when the concrete was brought up to surface level it was rolled with a 4-inch pipe; this 4-inch pipe was 23 feet long and the smallest dimension for the patch was always kept two feet less than the length of the pipe, so that the pipe could be rolled along the top of the level shuttering or screeds.

Another View of Superstructure Columns.

This method of finishing off proved very effective and cheap, as it not only gave a level surface, but squeezed out excess water and laitance. On the downstream edge of the apron a dwarf wall 3 feet high has been constructed to form a pond at the back of the gates and thus break the velocity of water when the gates are being opened; cross walls 3 feet high have been also built from the end of every fourth pier to the dwarf wall erected at the downstream edge of the apron, so as to prevent cross currents after the water has passed the gates.

Piers.

There are thirty-five piers and two abutments built as at 38 feet centres. They are 8 feet thick, 34 feet 6 inches high and 55 feet long. The foundations for the piers were carried at least 12 inches into the solid rock below the apron foundation, and the concrete was of 1—2½—5 mixture. The mean depth of the pier foundations was about 6 feet below the surface of the rock. All piers were built up in 6 feet lifts, with 6 feet by 3 feet wooden shutters, and these proved to be a very useful and handy size. For the first lift the shutters were braced to the apron, and to provide for the successive lifts bolts were cast into the concrete 10 feet apart and 6 inches below the top of the shuttering. This left a clear opening between the piers for the discharge of floods, and enabled the form work to be put up and dismantled at all times, providing of course that the river was flowing below the level of the last batch of concrete.

Reinforced Concrete.

All reinforced concrete is at least thirty-five feet above the level of the apron.

The whole of the materials for the reinforced concrete have been proportioned on the Duff Abrams method for the "DESIGN OF CONCRETE MIXTURES," and at present the proportions used are 1—1. 64—4 with a water ratio of 0.72 cubic feet of water to one cubic foot of cement and a relative consistency of 1.10. It should be mentioned that all crushed stone is saturated with water during crushing, so that the only water used subsequently is for the hydration of the cement. The sand does not absorb much moisture as it is almost pure silica. Where the reinforcement is close together, and there is little space for concrete as on the tension side of the beams, a slightly wetter mixture is used in order to facilitate the filling, and the stone is screened through a ¾ inch sieve.

Reinforced Concrete for Low Level Bridge.

The low level bridge consists of two lines of straight girders, 37 feet 10 inches long, 4 feet high and 16 feet thick, each weighing 14 tons, and with a clear span of 30 feet. These girders are designed to carry a Goliath crane, capable of carrying a 30 ton load. A smaller girder weighing 7 tons will carry one side of a foot bridge, and the other side is carried by one of the 14 ton girders. The smaller girders were all cast on the Transvaal Bank, and after two months were placed *in situ* and the larger girders were cast on the top of them. This was done to save the expense of building a gangway to carry the big girders. It was found that the large girders required a setting time of six weeks before they could be lifted without showing any deflection.

Superstructure Columns for High Level or Operating Bridge.

On account of the rapid filling of the small quantities of concrete required for this work, it was found that the pressures would be too great if a whole form was filled to its full height in one day unless the forms were strengthened considerably, and this would considerably increase the cost of the falsework. Owing to there being plenty of concrete work to go on with, these forms were filled in two stages, at intervals of twelve hours between each, and at the end of seven days the falsework was removed. The only factor which prohibited the removal of the forms in less time was the large cross beams required for bracing.

The falsework for the concrete for the high level bridge is carried on trussed timber beams (35 feet spans) at a height of 70 feet above apron level. These timber trusses are designed to carry 16 tons with a deflection of one inch, and are carried on eight steel pipe supports, each 27 feet high. The total load of wet concrete and falsework per span is 64 tons. All falsework is designed with a view to rapidity of erection, dismantling and re-erection and for use many times over without being unduly damaged. It was found that four sets of shuttering were sufficient for the 37 columns with occasional renewal of the boards.

Balance Boxes.

These will be cast *in situ* as soon as the falsework for the high level bridge is struck. Two of the trussed beams used for the high level bridge will then be lowered to the piers and the falsework for the balance boxes erected on them. Each box has six compartments with 5-inch outside walls and 5-inch partition walls. The compartments are each 4 feet 2 inches by 2 feet 8 inches by 7 feet 3 inches deep. These compartments will be filled with stone and sand to make up the requisite weight for balancing the gates. The angle iron used in the design of the falsework will subsequently be used for hand rail stanchions on the high level bridge.

Steel Gates.

The steel gates will be of the free roller type, and will be operated by hand in single units.

A complete gate will consist of eight steel bow string trusses, each 31 feet 7 inches long by 4 feet 6 inches deep in the centre, spaced and joined by ¼-inch steel skin plates. Each gate will weigh 26 tons and will have a travel of 34 feet, or 7 feet 4 inches higher than the highest known flood.

The operating mechanism will consist of:—

(1) *A Balance Box*, weighing about 62 tons, which is attached to the gate by wire ropes.

(2) *Conical Drums* around which the wire ropes attached to the balance box are wound.

(3) *Operating Headstocks.*

To raise the gates it will merely be necessary to withdraw a clutch which allows the balance weight to come into action. The design of the mechanism is such that the maximum accelerating force is exerted at the commencement of the travel of the gate. Once movement has been started the velocity continues to increase until the gate has travelled through a distance of from 12 to 15 feet, according to the setting. Thereafter, on account of the conical shape of the winding drums, a change takes place and the velocity commences to diminish and continues to diminish until the gate comes to rest. When the gate reaches its higest position, it has a tendency to reverse its direction of motion, and pawls drop into ratchet wheels and lock the gate in position.

Reinforced Concrete Wagon Bridge.

The Public Works Department wagon bridge will be constructed in units of four spans to the type of designs of the P.W.D. The shuttering will be carried on three trussed beams, and the total weight of concrete and falsework may be taken at about 52 tons per span.

Concrete Blocks.

It will be observed from the elevation of the piers that the base on which the P.W.D. bridge is carried is faced with concrete blocks, which were cast in moulds on shore. These blocks were made to save labour and timber. Blocks

MINES DEPT. EXAMS., 1920—1921.
CERTIFICATES AWARDED INSTITUTE.

SURVEYOR'S CERTIFICATES—March, July and October (Extra) Exams., 1920. 100 per cent., 50 per cent., and 66 per cent. respectively of S.A. total.
MANAGER'S CERTIFICATES.—Two Exams (Sept., 1920, Jan., 1921), 17 out of total 28 in S.A.; 12 Certificates, (including coal), May, 1921.
OVERSEER'S CERTIFICATES.—Two-thirds of the S.A. total for year 1920, and also for the first six months of 1921. No metal failures during 1921.
COAL CERTIFICATES.—Ten Certificates (1921) obtained.

Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St.

were also used for the upstream nosings of piers. They weighed from 90 to 1,200 lbs. each, and specially hard faces were made by means of a *plasterer's steel float*. The material forming the body of the blocks was in the ratio of 1—3—6, and the concrete was well rammed and made with very little water. The top ¼ inch was of sand and cement, also made fairly dry, and as much pressure as possible was put on at each stroke of the float. If too much work is put on these faces, the uncombined material in the cement is brought to the surface and eventually forms a thin film, which in setting, exhibits itself by the presence of hair cracks. The moulds in this case were removed in from 12 to twenty-four hours.

Transport.

All transport is brought from Vereeniging by ox wagon at 9s. per ton. This has been a considerable item, which will be realised when it is stated that everything except stone and sand has been delivered *via* Vereeniging to the Barrage works.

Plant.

The plant for construction includes:—One 110 h.p. B. & W. Boiler; one 100 h.p. Allis Chalmers air compressor, compressing 600 cubic feet of free air per minute to 75 lbs. pressure; three concrete mixers (2 Ransomes, 1 Standard); 8 ft. metal planing machine; two stone crushers; two portable engines with boilers; numerous small engines, pumps, etc., which are for the most part driven by compressed air.

From experience gained on these and other work, it is found that compressed air is more suitable than any other form of power, as it can be utilised for so many purposes.

Buildings.

The permanent buildings, required after the completion of the Barrage, were built in 1916 and the other buildings, which are only of a temporary nature, are built of sun-dried bricks and will be demolished when the Barrage is completed.

Labour Empolyed.

At the present time 49 Europeans (of which one-third are carpenters, and 250 natives are engaged on the work, but the maximum number of natives employed at any one time was 600.

Recreation.

The Rand Water Board have generously provided the camp with assistance by the provision of a billiard table, library, tennis court, golf course and a rifle club attached to the Defence Department.

The author desires to acknowledge the excellent work of Mr. C. E. Mason, the Principal Electrical and Mechanical Engineering Assistant, and Mr. M. Udwin, Chief Civil Engineering Assistant, in connection with the scheme, and also takes this opportunity of thanking the chairman, the secretary and engineering and secretary's staff for their willing help at all times.

ENGINEER'S LICENSING MOVEMENT BEING PUSHED IN UNITED STATES.

The movement for licensing engineers has gone further than is realised by most mining engineers. A synopsis of recent legislation as given in the last number of the official organs of the American Association of Engineers notes that the Arizona bill is a law, having been signed by the Governor on March 19; also the Colorado bill, signed by the Governor on April 4, "through efforts of the Colorado Section of Engineering Council." The Minnesota bill has become a law since the writing of the synopsis in question. On the other hand, the Montana bill, introduced by the A.A.E. chapter, met with the opposition of the Montana Society of Engineers and was killed. The New Mexico bill passed the Senate but failed in the House; and the same fate befell the Missouri bill on March 18. In California a bill sponsored by the A.A.E. was withdrawn from the Legislature. In Nevada, the bill met with the opposition of the mine operators and died in committee. Passing from the distinctly mining states, a bill for this purpose has become law in North Carolina; in New Jersey the bill became a law on April 1; in Indiana on March 10; in Tennessee on April 19. In Arkansas and South Dakota the bills have failed. In Texas the bill passed the Senate, but failed in the House. In South Carolina the bill failed in committee, "due to opposition from the farmers." Bills are pending in the legislatures of North Dakota, West Virginia, Ohio and Connecticut, being opposed in the latter two states by the Manufacturers' Association. In Pennsylvania, the bill pending in the Legislature is being opposed by various engineering societies in the state, and also by the Scranton Correspondence School, "it being their contention that the law might be construed against the so-called practical engineer." It has passed the House. In New York there now exists a licensing law, and a fight is on to so amend it as to permit corporation license. In Georgia, Nebraska and Oklahoma, the movement is being pushed. We have taken no editorial stand on this important question, but are watching its developments with interest. It behoves all mining engineers to do the same. We know that many are on each side of the question. The rest should ponder, and in their respective states frankly thrash out the merits and demerits of the plan.—*Engineering and Mining Journal*.

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The Week in the Sharemarket.

BRIGHTER OUTLOOK—BETTER NEWS FROM OVERSEAS—HIGHER GOLD PREMIUM—ALL ROUND IMPROVEMENTS.

Several good factors combined to brighten the outlook and cause an all-round improvement this week. President Harding's invitation to a Disarmament Conference, the Irish Truce, the return of the coal miners to work, and the improving gold premium, all combine to make for cheerfulness and confidence in the market. The discussions between the Chamber of Mines and the men are said to be proceeding amicably, though the rise in the premium may postpone the reduction in wages tnat is essential to the salvation of the low grade mines. Gold has fluctuated at higher levels during the week, touching 113s. 6d., and receding slightly. The movement of the American harvest is likely to improve the premium still further for a time. All gold shares are, therefore, firmer, notably those of companies like Randfontein, to which the gold premium makes most difference. Far Easts, of course, are all likewise better. Nor is the improvement confined to gold shares. Diamonds are regarded as an improving market, and in well-informed circles it is thought that a definite turn has now been taken in the demand for the stones, and, as a consequence, for diamond shares. All the latter have firmed up slightly on the week, and several of the low-priced varieties are being put aside against the day of the inevitable resuscitation of the market. Tin and silver, and lead shares are also firmer owing to the improved prices for their products. The base metal market is reported to be recovering on the other side, and silver is also much firmer. Colliery shares are quiet.

	Fri. 8th.	Sat. 9th.	Mon. 11th.	Tues. 12th	Wed. 13th.	Thur. 14th.
Anglo-Amer. Corp.	18 0*	18 06*	18 6*	19 3	19 9*	20 1½
Apex Mines					6 9*	
Aurora Wests			—	1 0*	—	—
Bantjes Cons.	5 0*	5 0*	5 0*	5 1*		5 0*
Brakpan Mianes			53 0†		51 9*	
Brick and Potteries.						4 0*
Bushveld Tins	0 8*	0 8*	0 8*	0 11†	0 7*	0 6*
Cinderella Cons.						1 6*
City and Subs.	2 0*	2 0*		2 0*	2 0*	2 0*
City Deeps	44 3*	45 6*	46 0*	46 9*	47 0*	
Clydesdale Colls.			26 0*	—	—	
Con. Diamonds	12 10½	13 6	13 0*	13 0*	13 7½	13 9*
Con. Investments	—					21 0*
Con. Langlaagtes		11 0†	11 0†	10 9*		11 0*
Con. Main Reefs	9 3*	9 6*	9 6*	9 6*	9 6*	10 3*
Con. Mines Select.				13 0*		13 6*
Coronation Freehold.	0 10*	0 9*	0 9*			0 10*
Do. Syndicates	7 0*	7 0	7 0	7 3*	7 0*	7 3*
Crown Diamonds	2 9*	2 9*	2 10*	3 3*	3 4*	3 9
Crown Mines				34 3*		37 0*
Crown Mines. Debs.					36 6*	—
Daggafontein Mines.	3 1*	3 3*	3 3*	3 3*	3 3*	3 3*
E.R. Coals	-	2 4†	2 6†	2 4†		2 4*
E.R. Deeps	0 6*	0 7*	0 7*	0 8	0 6*	0 7*
E.R. Minings	7 6*		7 6*		8 0*	-
E.R. Props	4 8*	4 6	4 8*	4 9	4 8*	5 0
E.R. Debts.	£67½*	£67½*	£67½*	£67½	£67½*	£67½*
Eastern Golds	--	0 7*		0 7*		0 7*
Frank Smith Dmds.	2 10	2 9*	2 11	3 1*	3 6	3 6*
Geduld Props.	49 9*	50 0*	50 3*	50 6*	51 0	50 0*
Glencoe Colls.	14 9*	14 11†	15 0†		14 9	14 9
Glynn's Lydenburgs	10 6†	-			10 0†	10 0†
Govt. Areas	75 6*	76 0*	76 3*	77 0*	77 6*	79 6
Hume Pipes		18 3†			-	18 6*
Jupiters					1 0*	1 0*
Knight Centrals	4 3†	3 10*			3 10*	3 10*
Lace Props.	6 0*	7 3†	7 3†	7 3†	7 3†	7 3†
Leeuwpoort Tins	9 6*	9 6*	10 0*	10 6	11 1	11 0
Lydenburg Farms	5 9*	5 6*	5 9	5 11	5 9*	5 11
Middelvlei Est.	1 5*					
Modder B's	26 0	26 6	26 9	27 6	28 3	28 3
Modder Deeps	42 0	41 9*	42 0*	42 9*	43 6*	44 3
Modder Easts	10 3*	10 11*	10 4	10 5	10 9	11 3
New Estates	23 0*	23 9*	23 6*	24 0	23 6*	23 9
Natal Navig Colls.	36 0	36 0†		35 9		
National Banks			225 0†	-		-
New Eland Diamonds				20 6*	21 0*	22 6
New Era Cons.	7 0*	7 0*	7 0	6 9*	7 0	7 3*
New Kleinfonteins	5 6†	5 0*	5 3*	5 0*	5 6	5 9
New Modders	64 9*	65 6	66 6	66 3*	66 6	67 3

	Fri. 8th.	Sat. 9th.	Mon. 11th.	Tues. 12th.	Wed. 13th.	Thur. 14th.
New Unifieds	—		4 0†	4 0*		4 0†
Nourse Mines		6 6	6 6*	7 0*	7 6	7 6*
Pretoria Cements	16 9*	16 6*	17 6	18 0†	17 3	17 6*
Princess Estates	1 1†	1 1†	1 0*	1 1†	1 1†	1 0
Rand Collieries						1 3†
Rand Rucleus			1 3†		1 1*	
Randftn. Centrals			8 6*	8 9*	9 0*	9 0*
Randftn. Estates	14 9	13 9	14 9	15 4½*	16 0	16 3
Roberts Victors	8 3*	12 0	12 0†	7 6*	8 0*	8 6*
Rooibergs		3 9*	3 9	4 0*	3 6*	3 9*
Ryan Nigels					4 3*	
Rouxvilles	1 6	1 6*	1 6*	1 6*	1 10*	2 0
South Van Ryns	2 9*	2 10	2 10*	2 0*		2 10*
S.A. Townships	10 0*	10 0	10 0*	10 0*	11 0	11 0*
S.A. Alkali	17 3		17 0*	16 0*	16 3	17 3
S.A. Breweries	28 0†					
S.A. Lands	4 1*	4 1*	4 1*	4 2*		4 1
Springs Mines	36 6	36 3*	37 0	37 6	38 3	39 3
Sub Nigels	11 0*	11 3*	11 3*	11 6*	11 6*	12 0
Swazziland Tins					10 0†	10 0†
Transvaal Silvers	26 3*	26 3	26 3	25 6*	25 9	25 9
Tweefonteins	18 6†	18 6†			19 0†	
Transvaal Lands	16 9*	16 9*			17 6	18 0*
Trans. G.M. Est.	7 6*	7 6*	7 6*	7 9*	8 0*	8 0*
Van Ryn Deeps	66 6	67 0	67 6	67 3	68 6	69 6
Village Deeps	6 6*	6 6*				7 0*
West Rand Cons.	2 3			2 0*		2 3*
Western Rand Est	3 6*	3 6*	4 0*	3 9*	4 3	4 3*
Witbank Colls.					15 0*	
Witwatersrand		10 9*				11 0*
Wit Deeps	7 0*	7 3*	7 3*		7 6*	7 0*
Wolhuters	3 5	3 4*	3 4*	3 4*	3 5*	3 5
West Springs	11 3*	11 3*	11 9	12 0		13 3
Union 5 per cent.	£97½*	£97½	£97½*	£97½†	£97½†	£97½
Zaaiplaats Tins.	3 2*	3 2*	3 2*	3 4*	3 3*	3 3*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Transvaal "Devels."

At the recent meeting of the Transvaal Estates and Development Company, Mr. Francis J. Dormer gave a very full review of the company's interests, as well as referring to general considerations bearing thereon. Dealing with the departure made on the present occasion in ignoring depreciation in the value of certain investments, he observed:—"Things are not entirely what they were, and the Official List cannot, under present-day conditions, always be accepted as the final arbiter of value to the extent that it used to be." Moreover, where land sold for its surface rights was proved to have mineral values, as in the case of the Sececoeniland asbestos deposits, and "the proof begins to figure in our income and expenditure account, we conceive ourselves entitled to call the new asset in aid as a set-off to depreciation in the current value of other assets."

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Control of the Explosives Industry.

Considerable South African interest centres in the report on the Explosives Industry, prepared by a sub-committee appointed by the Standing Committee on Trusts, under the Profiteering Acts, issued in mail week. The terms of reference were: To inquire into the existence of any trade combinations of makers of explosives and ammunition and the effect of any such combination or combinations, if found, upon supplies and prices.

After giving an account of its proceedings, the sub-committee state the result as follows:—

(a) There are in the explosives industry four combinations, viz.: (i.) The High Explosives Trade Association; (ii.) the Safety Explosives Trade Association; (iii.) the Electric Detonator Fuse Trade Association; (iv.) the Fog Signal Association.

(b) These associations fix the manufacturers' and retail minimum prices of practically all the explosives, detonators, and fog signals manufactured in this country. Moreover, by reason of supplementary agreements with foreign manufacturers, these prices become the standard prices of practically all imported explosives; there is virtually no price competition.

(c) Foreign competition may be said to be negligible except in the case of sporting and rifle ammunition, and there seems to be little prospect of it becoming severe in the near future in view of the agreements held by the Nobel Combine and the principal associations with foreign manufacturers, which have for their purpose, among other things, the standardisation of prices and territorial restrictions of markets.

(d) All the explosives' companies in this country, with the exception of three relatively small concerns, constitute one group under the control of Nobel Industries, Ltd., referred to in our resport as the Nobel Combine.

(e) This combine at the present time practically controls the policy of the various trade associations, and is thus able substantially to determine the prices at which explosives and detonators are sold in this country. The power of the combine is not affected by the competition of the independent manufacturers, and there is nothing to prevent the Nobel Combine from maintaining prices at a higher level than they would have been had their constituent companies remained unassociated.

(f) For the reasons stated in our report, the agreement of the Board of Trade and the Treasury with the Nobel Combine does not appear to afford a workable scheme of control or supervision, and we recommend, therefore, that the powers of the Board of Trade should be supplemented by statutory authority to require from the combine any information which may be necessary to enable review to be made of its operations and prices, and to enable the Board to make recommendations for the adequate protection of the consumer

(g) The formation of the Combine opens up the possibility of economies in management costs and overhead charges, and of increased efficiency in production, and points to the probability of general advantages resulting from centralised research and from the institution of central buying and selling organisations. The effect of it should be to reduce the prices charged to the consumer, but there is no guarantee that this will be the result, other than the powers given by the agreement to the Board of Trade, the inadequacy of which, in our view, we have pointed out. We regret that it has been found impossible, owing to the early expiration of our powers, to conclude an investigation into the costs of production and profits, or to make a complete survey and review of the financial operations and results of the Combine. In view of the monopolistic control exercised by the Nobel Combine over the explosives industry, we strongly urge that its operations should be brought under the continuous and effective surveillance of the Board of Trade or some other department of State on the lines of the recommendations contained in the report dated April 24, 1919, of the Committee on Trusts.

Rhodesian Railway Finances.

In the report of the Rhodesia Railways, Limited, for the year ended September 30, 1920, a much more favourable result of the year's operations appears than in the previous account. In place of the decline of £56,773 in gross revenue then reported, the present balance-sheet shows the very satisfactory increase of £349,556, with revenue of £1,407,852, compared with £1,058,296 in the previous account. This result is due to the increased rates of fares, which came into operation on April 1, 1920, and which would have produced even a better result but for the great increase in expenditure. A comparison of various outstanding items in the two accounts is as follows:—

	Year to Sept. 30, 1919.	Year to Sept. 30, 1920.	Inc.
Gross revenue	£1,058,296	£1.407,852	£349,556
Expenditure	568,175	852,166	283,991
Net earnings	490,121	555,686	65,565
Revenue from passengers ..	198,529	263,383	64,857
Revenue from general goods	472,080	663,003	190,923
Revenue from minerals ...	273,089	329.114	56,025
Revenue per train mile ...	14s. 10d.	16s. 7d.	1s. 9d.
Expenditure per train mile	7s. 11d.	10s. 0d.	2s. 1d.

The percentage of expenditure to gross revenue was 60·5 per cent., which showed an increase of 6·8 per cent. over the previous year. In the account for that year, however, the increase over the year preceding was 11 per cent., so that in this respect, too, the position is improved. The net revenue account shows a credit balance of £21,995, compared with £58,532 the previous year, which, added to the carry-forward, gives a total of £210,886 at the date of the account under review. The directors announce that the arrangement with the Beit Railway Trust for providing a sum of £446,000 to carry out new works and improvements has been cancelled owing to the need for further working capital, and in its stead an arrangement has been made for an issue jointly with the Rhodesian Railway Trust of £2,000,000 ten-year joint secured notes, carrying interest at 6 per cent., tax free, and of this total £1,700,000 notes had been sold up to the date of June 11.

Letters to the Editor.

RE GOVERNMENT CABLES TO HIGH COMMISSIONER.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—I have to thank you for the publicity you have given to the telegrams I sent to the Right Hon. the Minister of Mines and Industries during the debate on the estimates for his department. In your last issue, July 9th, however, you print a report of statements made by the Minister to the effect that I had "brought in the names of his technical officers and put forward views supposed to come from them which were not their views." These statements of the Minister provoked my indignant denial of these statements contained in my last telegram to the Minister, which you were good enough to publish in your issue of July 2nd. The publication of the Minister's statements a week after their denial by me leaves the impression that they were allowed to pass unchallenged, and I would be grateful if you could find room to reprint the enclosed article from the *South African Review*, which puts the position briefly but clearly.—Yours faithfully,

W. E. BLELOCH.

[We regret that on account of pressure on space we are unable to reproduce the article in question, which, as Mr. Bleloch remarks, puts the position very clearly. The article states, *inter alia:* "The *Star* of the date mentioned by him (the Minister) is before us, and it shows that Mr. Bleloch never used Dr. Rogers' name, nor Dr. Rogers' views, nor, in fact, ever said anything at all remotely justifying Mr. Malan's statement. What is worse, before the debate of last week was concluded, Mr. Malan had before him Mr. Bleloch's indignant denial, telegraphed from Johannesburg, notwithstanding which Mr. Malan left the House under the wrong impression he had created by his inaccurate statement It is, therefore, seen that on Mr. Malan's own evidence the damaging cables to London were sent on wrong information supplied to him.—Ed., *S.A.M. & E.J.*]

"Froth Flotation as applied to the Washing of Industrial Coal."

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—I have to tender you my sincere thanks for having sent me a copy of the "Canadian Mining Journal" of the 20th May last, which contains a copy of a paper read before the Institution of Mining Engineers, Manchester, 15th

ELECTRICAL ENGINEER.

South African, Age 32, Married, desires suitable appointment in South Africa. Nine years' practical experience, six years with large English Electrical Company, and three years as assistant to Chief Electrical Engineer of large Scottish Steelworks group, where presently employed Technical Training: South African College, Cape Town

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93, N. Frederick Street,
GLASGOW.

Kroonstad Coal Estate Company, Limited.

TENDERS FOR TREES.

TENDERS ARE INVITED and will be received by the undersigned up to and including Saturday, the 30th day of July, 1921, for the purchase of approximately 2,000 Growing Gum Trees, suitable for Mine Props, on the above Company's farms, Vierfontein and Swartfontein, O.F.S., near Klerksdorp.

The successful tenderer will be required to cut and remove the trees at his own expense.

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September, 1920, by Ernest Bury, Walter Broadbridge and Alfred Hutchinson, on " Froth Flotation as applied to the Washing of Industrial Coal," a copy of which paper will, I understand, be in your next " Coal Number," which I think you told me is now in the printer's hands.

I have not only read and re read the article with interest I think this is the usual way of expressing oneself), but I have read it with unbounded pleasure.

The said " Froth Flotation as applied to the Washing of Industrial Coal " will effect what will practically be a revolution in metallurgical practice, and will bring joy to the hearts of manufacturers both great and small.

The process is worth untold millions of money to the Union of South Africa and Rhodesia, and will do more to restore normal conditions in Europe than all the Leagues and Councils between Timbuctoo and Mesopotamia.

The process is worth to France more than ten times the amount the war has cost her. If I had the handing out of titles, decorations, etc., I should ask Messrs. Bury, Broadbridge and Hutchinson, the Directors and Engineers of the Skinningrove Iron Company, and last but not least the Directors and Engineers of " Minerals Separation, Ltd.," to honour me by an early call.

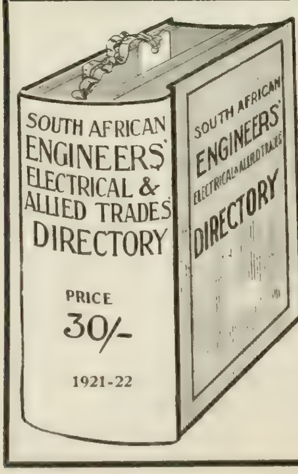
This process will mean Beef and Beer to untold millions.

I will send you shortly a paper describing how the process will affect the small manufacturer, so that he, too, may catch a glimpse of the golden future.—I have the honour to be, sir, your obedient servant,

G. H. BLENKINSOP.

New Cape Central Railway.

Though the gross traffic revenue of the New Cape Central Railway increased by £8,422 to £152,900 in 1920, the receipt per train-mile was smaller and the growth of expenditure was so considerable that the profit per train-mile receded almost to the 1917 level. The rise in working costs was £21,700, of which £11,100 was in maintenance of way and £10,300 in locomotive power. Miscellaneous income improved £3,700, and after providing for £2,800 additional for London outlays all accounted for by the corporation tax —net revenue was £12,400 down at £25,100. In place of appropriating £12,000 for renewals the Directors now allocate £2,000 to reserve. The dividend is reduced from 4½ to 4 per cent., saving £2,609, and as £2,000 more was brought in the carry-forward at £4,400 is £2,200 up. Balance-sheet changes were of no moment.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Foreign Companies registered in June.

The Climax Rock Drill and Engineering Works, Ltd., £60,000; Grosvenor Bullion Syndicate Ltd., £35,000; North British Rubber Co. (South Africa), Ltd., £10,000; British Shoe Manufacturers, Ltd., £50,000.

The capital of the following companies has been increased:—Haak's Garages, Ltd., from £30,000 to £50,000; Aluminium Works, Ltd., from £2,500 to £5,500; Kendal Forest Co., Ltd., from £1,500 to £10,000; African Films Trust, Ltd., from £45,000 to £50,000; French Engineering Works, Ltd., from £6,100 to £7,500; John Massey & Co., Ltd., from £5,000 to £10,000; Benoni, Brakpan and Springs Board of Executors, Building Society and Trust Co., Ltd., from £40,000 to £75,000; W. Lipworth & Co., Ltd., from £50,000 to £60,000; Fred. Cohen, Goldman & Co., Ltd., from £30,000 to £45,000; Gilbert & Co., Ltd., from £5,500 to £17,500.

The following companies have been placed in voluntary liquidation: Springs Auction and Estate Co., Ltd., capital £2,000; Composite Block Flooring Co., Ltd., £500; Alberton Estate Syndicate, Ltd., £11,592; Rand Lime Co., Ltd., £18,000; African Property and Livestock Co., Ltd., £500; Barretts' Rietfontein Syndicate, Ltd., £22,500; Hector Lezard and Ben Hart, Ltd., £2,000; Rietfontein Farms, Ltd., £2,000; African Theatres Trust, Ltd., £100,000; Lesser Minerals Trust, Ltd., £3,000.

Boring on Grootfontein.

It may be remembered that the New Consolidated Gold Fields, Ltd., Rand Mines, Ltd., and the Rhodesia Consolidated, Ltd., are sharing the expense of an important borehole which is being drilled on the Grootfontein farm on the Far Eastern Rand. The last-named company has, in this connection, issued to its shareholders a communication dated May 6th, giving details of the progress of the above borehole. It appears that a few days earlier the drill had reached a depth of about 2,300 feet, after having passed through a thickness of 437 feet of Kimberley shales. Judging by the respective depths of the various strata in the Daggafontein and Springs properties to the north of Grootfontein and in the Sub-Nigel to the south-east, it is estimated that the Grootfontein borehole should reach the main reef leader (the ore body which is being worked so successfully on the big Eastern Rand mines) at a depth of about 3,400 feet. The original estimated cost of £5,200 is expected to cover easily the total expense of finishing the borehole. Of course it is a pure gamble whether the drill cuts the reef in a rich or a poor section, but its chief object is not to ascertain values. It is to prove the regularity and the thickness of the various strata. If the indications prove satisfactory we shall doubtless see fresh activity in the Grootfontein neighbourhood in due course.

Houtpoort, Ltd.

A report has been issued, dated June 1, 1921, on the portion of the South-East Rand in which Tulipvale and Klippoortje properties are situated, by Mr. H. S. Denny, C.B.E., M.I.M.M. The report reads as follows;—" Regarding the following properties, situated in the South-East Rand—viz., Southern Van Ryn, Houtpoort, Townlands of Heidelberg, and Boschfontein—I beg to inform you that, to my mind, the consensus of all leading technical opinion has now been definitely confirmed by the official statements of the Government of the Union of South Africa as to the continuity of the all-important Van Ryn reef southwards through the Southern Van Ryn and Sub-Nigel mines, through the Maraisdrift, Houtpoort, Townlands, and Boschfontein properties. Such being the case, you should undertake the necessary serious development on a proper scale, and in my opinion you will inevitably demonstrate the fact that your properties contain similar alternations of rich and poor ore proved in recent years to be so characteristic of the great mines lying to the north." An extract from the manager's report received by last mail reads as follows:—" We have located a new outcrop (of Van Ryn reef) near the railway bridge The outcrop shows a big thickness of reef; sample panned, 30 dwt "

TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS "HANGING," BUT FEELING AS TO FUTURE OPTIMISTIC—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—OILS AND COLOURS—ELECTRICAL GOODS—EXPLOSIVES—BRITISH COAL CONDITIONS—OIL—UNION RAILWAYS' HEAVY DEFICIT—BRITISH TRADE RETURNS—BREVITIES.

General Position.

Business is still "hanging," although there is an optimistic feeling about that things, now that the coal struggle is ended, will improve later on. Money still remains very tight, and its effect is being seen in the continued forced realisation of stocks at prices which are below replacement values. With the low exchange with America presently ruling, the premium on our gold will probably rise. There is bound to be a tremendous amount of exports from America to Britain between now and next year, which, as far as merchants here can judge, will not be paid for in gold but in exchange; in other words, while the exchange with America seems likely to go lower for some little time to come, our gold premium, on the other hand, may advance, or at any rate, not decline to any considerable extent from its present level. But the biggest factor towards stabilisation of our mining market lies, in the opinion of one of our foremost commercial men, in the fact that the depletion of mines' reserve stocks has advanced to such a stage that it must shortly be imperative for the different groups to re-enter the open market for replenishment, to the benefit of mining merchants. Until that day arrives—and in the opinion of well-informed judges it may arrive very shortly—it is futile to expect an improvement and to stem the present downward tendency in prices. One great factor behind the recent and present decline is the knowledge that present stocks can be replaced—if not from Britain, at any rate from the Continent, at prices well below cost. Galvanised iron shows a slight rise in Britain, and her market is bound eventually to strengthen, of which we have already received proofs in regard to demand for coal. Nor is the Irish truce—leading, let us hope, eventually to a settlement—an insignificant factor in the general feeling that we are on the eve of more stable business conditions.

Iron and Steel.

Trading during the past week has been of the quietest possible description, with but very little activity showing itself on the Commercial Exchange. Steel plates, however, which have of late not been in acceptance, have, during the past few days, been more in demand, especially the larger sizes, and are firming up. Otherwise there are no features of importance to record. However, an improving tendency in the iron and steel industry is looked for by merchants very shortly in response to the coal settlement.

Latest nominal quotations: Dunswart, 29s.; Union Steel Corp., Ltd., ordinary sized rounds, flats and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 49s. 6d.; ⅜ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 49s. 6d. to 62s.; ¼ in. square iron, 55s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. to 62s. 6d ; channels and joists, 47s. to 48s.; imported angles, 45s. to 47s.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in., ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 57s. 6d.; ⅝ in., 55s. per 100 lbs.; per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. to 57s.; shovels, 60s.; wheelbarrows, 55s.; picks, 45s. to 75s.; shovels, 60s. to 70s.; wheelbarrows, 70s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire,

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Newcastle Iron and Steel Works.

A director of this company just returned from a periodic visit to the works, says everything there is progressing well. A metallurgist has now arrived there from Australia, where he has been engaged for some time on similar work to that now to be done at Newcastle. Iron ore, lime and coke are now being brought to the property against opening operations, when it is expected that there will be about 4,000 tons of ore and 1,000 tons each of coke and lime at the works. A 100-ton weighbridge has been erected and completed.

Engineering Shops.

The more hopeful conditions on the other side, though not in themselves of paramount importance to industrialists here, are still not without encouragement to anyone having the interests of Britain at heart. But, said an engineer in a large way of business, there will not be much improvement out here until we consume our own products. From an engineering point of view, if we don't watch the engineering industry in South Africa, we shall soon be represented by a few thousand fitters, supervised by a number of technical experts, erecting and running engineering concerns of other countries. Until our engineering firms were recognised as makers, instead of repairers, of articles, there would be no improvement in the condition of the industrialist in this country.

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The contract in respect of the Apapa wharfage scheme, Lagos Harbour, Nigeria, has been secured by Sir W. G. Armstrong Whitworth & Co. The contract includes the provision of deep-water berthage for ocean-going steamers, providing for 25 to 30 feet of water, the erection of five transit sheds, reclamation and dredging of foreshore, etc.

Timber and Building Materials.

Business is exceedingly quiet in the absence of any large building operations. No great activity is expected until the wages of operatives have been reduced. Stocks of timber are abundant. No further news has come to hand from the Baltic with regard to future prices, but, in any case, seeing that timber has been sold during the past few months at about par or even below, no great reduction in prices can be looked for just now. 3 by 9 deals are 1s. 2½d. to 1s. 3d.; scantlings, 1s. 2d.; beaver board, 5s.; Oregon, 9s.; pitch pine, 9s. to 9s. 6d.; floorings, 7½d. to 7¾d. (a drop of about ¾d. to 1d.); ceilings, 5¼d. to 5½d. (a fall of about ½d.); corrugated iron, 24 gauge, 9½d. to 10d. Furniture timber: Burmah teak, 20s.; American oak, 1in. to 3in., 1s. 5d. per super; American black walnut, 1in. to 4in., 1s. 6d. per super; West African mahogany, 1in. and upwards, 2s. to 2s. 3d. per super; 3-ply ash, 5mm., 10d. per super. Bricks remain unchanged at from 70s. for blue stock, 60s. for mixed, £4 10s. to £5 for wire cuts, and £5 for pressed per 1,000 at yards; white lime, 7s.; unslaked, 7s. 6d.; building lime, 4s. 3d.; plaster lime, 5s. 3d.; cement, 11s. 6d. a bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 47s.; 3-ply, 55s. 3d.

Second-hand Iron and Timber Yards.

Business is of the scantiest, and the tendency is weaker; a probable 5 per cent. reduction in prices is expected before the end of the month. Iron at the moment is ruling at 6d., timber at 10d., casements 9s. to 25s., mouldings from 2½d. Dealers report that the reason for the present dullness is the high cost of labour, as that for building materials is now fairly satisfactory, and that until the level of wages comes down, no activity is looked for in building operations.

Oils and Colours.

White lead in oil, small sizes 1s. per lb., 41s. per 50 lb. kegs; red lead, 1s. and 11d. per lb. in 50 lb. kegs; linseed oils, raw or boiled, small bottle, 1s. 9d.; 7 lb. tins, 8s. 6d.; 4 Imp. gal., 42s. 6d.; turpentine, small bottle, 2s. 6d.; 10s. per ·83 Imp. gal.; turpentine substitute, 6s. 6d. per tin, each 5-6ths Imp. gal.; red oxide in oil, 50s. to 65s. per 100 lb.; purple oxide in oil, 45s. per 50lb. keg; putty: finest linseed oil, in 100lb. drum, 6½d. lb.; English, in bladders, 7½d. lb.; colours ground in oil, 1s. 6d. to 4s. 6d. lb.; dry colours, 6d. to 6s. 6d. lb.; colours ground in water, 1s. to 2s.; in turpentine, 3s. 6d. to 11s. lb.; motor colours ground in good size, 3s. 6d. to 6s. 6d. lb.; leadless flat wall paint, 32s. 6d. per 5-6ths Imp. gal., 37s. 6d. per Imp. gal.; roof paints, 17s. 6d. per 14lb. tin, 85s. per 70lb. drum; enamels, from 35s. per ·83 Imp. gal.; varnishes, from 2s. 6d. to 4s. 1-16; pumice stone, 1s. 3d. lb.; beeswax, 2s. lb.; alum, 9d. lb.; gum arabic, 3s. 6d. lb.; methylated spirits, 5s. 6d. a tin, 5-16 Imp. gal.; bottles, 1s.; common glue, 1s. 3d. lb.; good quality cake, 1s. 9d.; finest Russian, 2s. lb.; English gold leaf, plain, per book, 3s. 9d.; transferred, 4s. 3d.; aluminium leaf, plain, 1s. 9d. per book; transferred 2s. per book.

Electrical Goods.

Conditions remain more or less dormant; with the exception of a little support from the country, business is very dull. In Middelburg, from which district orders sooner or

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later are expected in regard to the new electric light installation, there is still very little doing, and until the consumers see the light as an accomplished fact in the town little is anticipated by dealers here as regards extensive orders. This will not be before September or October, and until then the Municipality seems disinclined to go on with contracts; but once power has been installed and revenue from consumers can be reckoned upon, contractors here and elsewhere will be called upon. Prices of electrical wares remain unchanged, but the tendency, in view of the end of the coal strike, is for them to come down, but dealers so far have heard nothing from Home of any reductions. Continental goods are arriving steadily, at prices a long way below British—in some cases 50 per cent., but generally 20 to 25 per cent.

Explosives.

The British South African Explosives Co., we understand, are at present carrying stocks more than sufficient for six months' demands of the mines. There can, it is said, be no question at the moment of lower prices, as the lower freights and cheaper cost of materials will take some time—roughly about six months—before their effect can be reflected here. But a reduction later on in the price of explosives is anticipated.

British Coal and Miners.

The feeling on the other side is that with the re-opening of the coal mines better times are not far distant. Already inquiries have been received for British coal, which will be handled as soon as the Home requirements have been met.

British Coal Miners.

Work, with a few exceptions, has now, it appears, been resumed. Naturally, after such a long stoppage, many difficulties had to be faced in regard to the condition of the pits, but in view of the general desire to restart work, no insuperable obstacles are anticipated to a general resumption of operations.

Railways' Heavy Deficit.

Mr. Jagger, in the House of Assembly, had again the painful experience of reporting further heavy losses on the working of the Union's railways. He stated that the balance of revenue on working expenses up to the end of March had increased the deficit for the year 1920—21 to £1,049,000, bringing up the total to £2,598,000. Nor does this put a period to the losses incurred, for revenue, unfortunately, is still falling off. April showed a loss of revenue of nearly £50,000, which was followed by a loss of nearly double that amount in May, bringing the total loss on the two months of the current year to £363,000, and the total debit balance to close on £3,000,000 at the end of May. This, said the Minister of Railways, reflected the trend of trade. The Government were doing all they could to develop the country and to effect all possible economies. In the meantime, in view of February pledges of large railway and harbour developments, this very large and recurrent falling-off of revenue is causing much perturbation. ...

British Trade Returns—Heavy Declines.

Affected by the coal stoppage, these show that imports for June were 88 millions and exports 38 millions, showing, as compared with June, 1920, decreases of 82 millions and 78 millions respectively. The imports for the six months ended June 30th were £571,500,000, exports £369,000,000, showing decreases of £461,250,000 and £268,000,000 respectively compared with the corresponding period of 1920.

Mine Wages.

The new proposal of the Chamber of Mines that the reduction of wages per shift should be 1s. 6d. instead of 3s. is now under consideration by the joint executive of the Unions.

Floating Exhibition of British Manufactures.

A company has been registered, with a number of prominent business men as directors, to build a large ship to cruise round the world as a floating exhibition of British manufactures.

Government Ownership of Corn Steamers Condemned.

A very large shipowner has condemned the policy of Governments attempting to run merchant ships. The Commonwealth Government has lost half a million recently. Government lines are too severely handicapped in respect to charges as compared with private owners.

Proposed Line of Steamers from Hull to South Africa.

An agitation is at present on foot to promote direct steamship communication between Hull and South Africa, which, it is urged, would effect great saving in connection with the wool trade and also be of considerable benefit to the fruit industry of South Africa.

Financial.

As against the Union of South Africa's serious financial position, the Australian Federal finances, with the balance from the previous year, show a surplus of £6,000,000 for the last year.

International Credits Scheme.

Business men of all nations are supporting this, and prospects of its adoption are regarded as very promising.

Uranium in the Congo.

The Brussels papers announce that further samples of uranium ore from the Luiswichi copper mine, belonging to the Union Miniere, are being sent to Brussels for analysis and report. An analysis of the first sample has been made by three Belgian mineralogists at the request of the Union Miniere and, it is added, has given encouraging results. Both the Tanganyika Concessions and the Zambesia Exploring Companies are, of course, largely interested in the Union Miniere Company.

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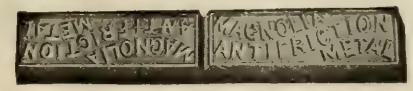

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Springs and Premium Bonds.

A REPLY TO THE CHURCH COUNCIL.

We have been asked to give publicity to the attached letter, which has been sent to the Secretary of the Witwatersrand Church Council by the Secretary of the Springs and District Chamber of Commerce.

It will be recalled that the Chamber made a proposal to the Daggafontein Commission of Enquiry for raising capital by the issue of Premium Bonds by the State. We find ourselves quite in accordance with the Chamber's views on the subject, and as it is the policy of this journal to give prominence to expressions of opinion which voice means of facilitating the development of the country we give hereunder the view of the Springs Chamber of Commerce:

Sir,—The attention of my Chamber has been called to a copy of a letter from you which appeared in the press recently and which, it is understood, is being widely circulated among Members of Parliament and others.

My Chamber appreciates the motive which has caused your Council to publish this letter, and realises that you are acting—in your opinion—solely in our country's interests, which we all have at heart in these difficult times.

My Chamber, therefore, all the more deeply regrets your action in condemning the scheme submitted by us for raising money by the issue of Premium Bonds without first having given us an opportunity to explain the scheme to you and to controvert your arguments against it.

Your Council possibly does not realise the tremendous volume of public opinion which is behind our proposal, and it is no exaggeration to say that we have had evidence of the popularity of the suggested issue of Premium Bonds from all parts of South Africa.

My Chamber observes with regret that your Council has fallen into the common error of confusing Premium Bonds with State Lotteries. This would not have occurred had we been given an opportunity of explaining the matter to you. My Chamber does not advocate State Lotteries, but a purchase of Premium Bonds can in no way be considered a gamble since the capital invested, together with a small rate of interest, is guaranteed by the Government. It is true that a number of prizes would be drawn for every year, but this may be compared with the well-known practice of issuing debentures at, say, £100 redeemable at £110, drawings taking place each year to decide which debentures shall be redeemed in that year. The lucky holder whose debenture is drawn in the first year is in the same position as one who draws a prize on his Premium Bond, and we are unaware of any objections having been raised by the Churches to this procedure.

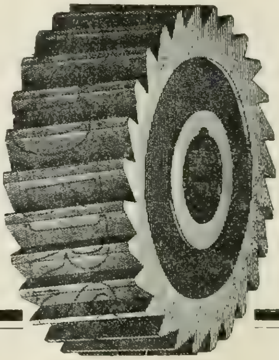
It is also to the point to refer your Council to the element of speculation which existed in the issue of Victory Bonds by the British Government some time ago, and, indeed, in the purchase of any so-called gilt edge security. Yet we have not heard of your Council having taken exception to this, nor do we suppose that you object to the principle of insurance. Insurance, however, in many respects may be compared with Premium Bonds. A man insures his life for a sum of money by paying a small annual premium, and if he dies soon after taking out his policy the Insurance Company has made a bad speculation. Nevertheless, few people oppose the principles of insurance to-day, and when the subject is better understood the same remark will apply to Premium Bonds.

If the issue of Premium Bonds is wrong, as you say, owing to the lottery element, is it not reasonable to apply the same argument to insurance and other speculative investments mentioned in the previous paragraph?

With regard to your fear that Premium Bonds may detrimentally affect our finances and the people's moral character, the manner in which France withstood the strain of the Great War is sufficient answer, for in that country Premium Bonds are very popular and widely held by the small investor.

In conclusion, I am to add that my Chamber is sincerely anxious to meet your Council to put forward our views more fully than is possible here, and it is hoped that even at this late hour you will afford us the opportunity to do so.

As your letter was published in the Press, it is proposed also to publish this reply.



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Coal Dust Risks.

Since the introduction of pulverised coal as a substitute fuel for natural gas in the various heating furnaces used in steel mills, says L. D. Tracy (coal-mining engineer of the United States Bureau of Mines), a number of fires and explosions have occurred, resulting in the loss of life and property. As one of the primary functions of the Bureau of Mines is to conduct investigations, in the utilisation of mineral substances with a view to increasing safety in the use thereof, it was deemed advisable to investigate the hazards involved in the industrial use of pulverised coal, and, if possible, to devise methods of preventing future accidents arising therefrom. The knowledge of the explosive qualities of coal dust which the Bureau has gained in studies affecting dust explosions in coal mines was of material assistance in these investigations. Several plants were visited in which either fires or explosions had occurred, and data obtained as to the probable cause of the accidents. There was found to exist, among some of those employed about the furnaces, a lack of knowledge of the explosive and inflammable qualities of powdered coal. A small stream of pulverised coal leaking down from a defective joint in a coal transport line did not attract much attention, whereas, had a leak in a natural gas line occured under similar circumstances, no doubt it would have had immediate attention. As a matter of fact, if by any means the dust cloud should come in contact with an open flame or hot metal, the effects would be as disastrous as if it had been gas. One of the most serious troubles with which users of pulverised coal have had to contend has been the number of fires in the storage bins for the material. It has been somewhat difficult to determine the exact cause of these fires, but undoubtedly spontaneous combustion has played an important part in the origin of some of them. It is obvious that coal when finely powdered presents a much larger surface and a much larger quantity of coal to contact with oxygen than when in solid masses. In some of the systems used in drying and pulverising coal, the fine coal, about 90 per cent. of which will pass through a 100-mesh screen, and 70 per cent. through a 200-mesh screen, is delivered to the storage bins at a temperature of 125 deg. to 130 deg. F. It is possible, however, for the person running the drier to permit the fire to become hotter than normal, and thus overheat the coal in the drier. Where the drier becomes overheated, the coal may be delivered to the storage bins at a temperature at or above 130 deg. F. If left in the bin for a comparatively short time, it is very probable that the temperature of the coal will rise to such a point that, when mixed with air, the coal will burn rapidly. Overheating of the coal is especially liable to happen in the type of drier commonly known as "direct heat" drier, in which the gases from the combustion chamber pass directly through the centre of the drum and come in contact with the coal passing through. Particularly is this true if, for any reason, the drier should stop running, while, at the same time, the fire on the grates is permitted to continue burning.

PRECAUTIONS SUGGESTED.

In connection with the above-mentioned hazards, the following suggestions may not seem out of place. Care should be taken that pulverised coal is not delivered to storage bins at a high temperature, and to avoid this the gases of combustion from the drier furnace should not be allowed to become hot enough to overheat the coal. In "direct heat" driers the fire should be so maintained that red-hot cinders will not drop into the screw conveyor feeding the pulveriser. The entire safety of the pulverising plant largely depends upon the man tending the fire in the drier.

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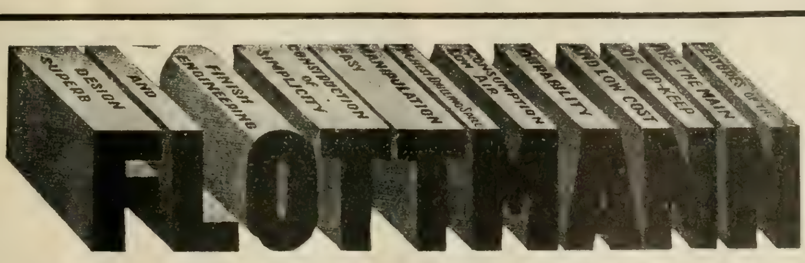

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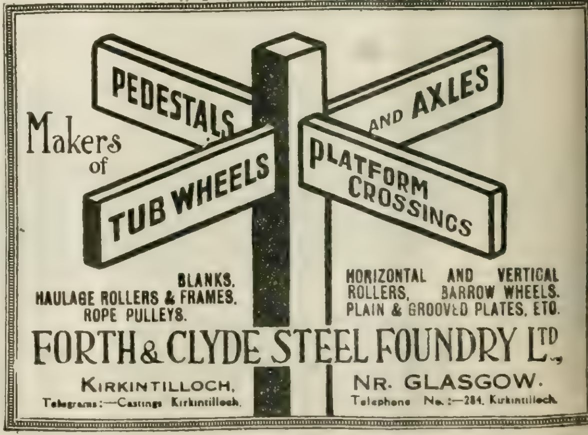

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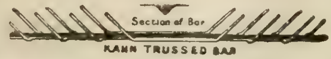

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The Winning Essay : In this Issue.

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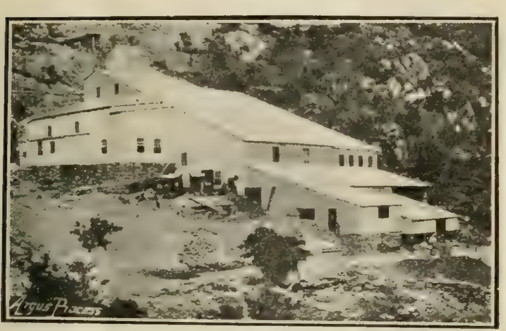
Vol. XXXII , Part I JOHANNESBURG, TRANSVAAL, SATURDAY, JULY 23, 1921. No. 1556.

SOME TIN AND SILVER-LEAD MINES OF THE TRANSVAAL.



Leeuwpoort Reduction Works.

The Zaaiplaats Tin Mine.

Edendale Silver-Lead Mine.

View at the Transvaal Silver and Base Metals.

Elsewhere in this issue we deal with the improving outlook for base metals. The four photos given above depict scenes at typical tin and silver-lead mines.

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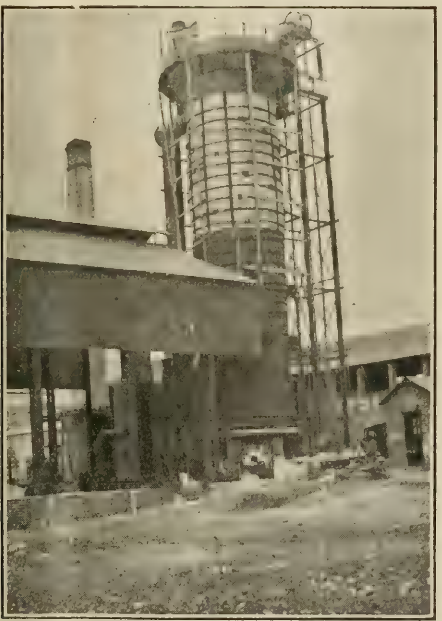
THE STEEL CONTRACT.

THE GOVERNMENT AND THE SOUTH AFRICAN IRON AND STEEL CORPORATION—WARNINGS OF 12 MONTHS AGO RECALLED—THE MILLION-AND-A-HALF COMPANY THAT NOW REQUIRES NOT LESS THAN TWO AND A HALF MILLIONS—ONLY 350,000 SHARES ISSUED—WAS THERE A GUARANTEE, AND WHO WERE THE GUARANTORS?—MR. MALAN'S EXPLANATION—PAVING A PATH TO THE PUBLIC PURSE—PERTINENT ENQUIRIES.

In a period of stagnation such as besets South Africa to-day the position of the South African Iron and Steel Corporation calls for special attention, for it was this concern which was going to bring into our midst a great iron and steel industry which would forge rails for Sir William Hoy's far-flung administration, and which would make machinery for the mines and agriculture. This Corporation would, we were given to believe, exploit the iron ores of the town lands of Pretoria and elsewhere. It would develop coal measures with a view to the production of coke and open up deposits of flux. The S.A. Iron and Steel Corporation was in fact going to impart a big element of "hustle" into the somnolence of South African industry, and the company would, of course, afford employment to a large number of Europeans.



Blast Furnace at the Pretoria Iron Works.

An Alluring Prospect.

It was certainly a pleasing picture that was painted by the artists of the dawn of the Iron Age in Southern Africa, and small wonder that it enraptured a large number of people. We must say that the vision captivated us, and in the special Coal, Iron and Steel supplement of this journal which was published a year ago we dealt optimistically and at length with the prospects of the new flotation and discoursed on the achievements of the Pretoria Iron Mines, which had been absorbed by the larger Corporation, backed as it was by influential interests which were understood to include two leading mining houses of the Witwatersrand, the National Industrial Corporation (closely associated with the National Bank) and certain other firms and interests. The prospects certainly appeared to be alluring, provided that sufficient money was forthcoming for such an ambitious undertaking, and there seemed at the time to be every reason for supposing that the necessary capital would be available.

The Government is Captivated.

The undertaking seems to have captivated the Government as well, and much as we admired the boldness of the scheme and its industrial glamour, we felt compelled to disagree with the Smuts Ministry when the agreements entered into between the Minister of Railways and the Pretoria Iron Mines, otherwise the S.A. Iron and Steel Corporation, were ratified and confirmed in the face of the recommendation of the Select Committee that the agreements should not be ratified.

The Historical Contract.

Awaiting Capital: The Pretoria Iron Works.

It will be recalled that the chief clause in these contracts is that the Railway Administration agrees to take from the Corporation one-half of its output of rails and other iron and steel requirements, and in confirming and ratifying this agreement Parliament committed the iron and steel requirements of the Railways of the country to the South African Iron and Steel Corporation, Ltd., for a period of 17 years; and this notwithstanding the existence of an agreement of a very similar nature entered into by the Government with the Union Steel Corporation at Vereeniging nine years ago, and which latter agreement still has seven years to run. The Select Committee on Railways and Harbours, in their seventh report, recommended that the agreements should not be confirmed, and contended: "Your Committee, having considered the memorandum of agreement between the Minister of Railways and the Pretoria Iron Mines, Ltd., and having taken evidence thereon, reports that, while recognising and approving of the desire of the Administration to encourage the establishment of an iron industry in the Union, is of opinion that a better means to that end would be to follow the example of the Government of India by intimating publicly that the Administration will be prepared to purchase its requirements in South Africa without binding the Administration to any one manufacturer, and recommends that the proposed agreement be not confirmed." Sir Thomas Smartt's motion for an adjournment in view of the fact that the report and evidence had only recently been placed in possession of members found a good deal of support, but the Government, aided by the Backveld, rushed and steam-rollered the sanction of the contract through the House. The voting was remarkable. The Nationalists threw in their lot with the Government and ranged themselves against the majority of the Unionists, Mr. Merriman, and the Labourites.

Words of Warning.

It is not often that this journal finds itself on the side of Labour, but in this particular instance we were quite in sympathy with Col. Creswell, Mr. Boydell and Mr. Sampson, who, with the majority of Sir Thos. Smartt's party, strenuously opposed the ratification of the contract, and who pointed out the many pitfalls and perils which might result from the signing of the contract. We wrote at the time: For if this agreement does not constitute a monopoly it constitutes something perilously near it, and at a time too when South Africa is just beginning to realise its iron and steel producing potentialities. The S.A. Iron and Steel Corporation is not the only enterprise in this country which proposes to manufacture iron and steel in South Africa from South African ores. There is the Newcastle Iron and Steel, Ltd., which is well on its way to actual production and for which company Mr. J. K. Eaton, the managing director, tendered evidence before the Select Committee, and according to the Minister for Railways the majority of the Committee were greatly impressed with Mr. Eaton's evidence. The Union Steel Corporation also gave evidence in support of their contract with the Government, which was entered into eight years ago and which it would appear has caused the Government considerable regret. Whether the warnings of some members of the House will materialise and will cause the Government in the fulness of time also to regret the new contract which it has entered into with the Pretoria Corporation remains to be seen. For the present the cardinal fact which dominates all others in connection with the establishment of an iron and steel industry is that Pretoria, that most favoured city of the Union, has secured a preference to the probable detriment of other centres which are endeavouring to inaugurate an iron age in this country. True, the iron is there. But the history of the steel industry in other countries seems to make it clear that it is often better policy to bring the iron ore to the coal fields than to transport coal to the iron mines. Certainly no other town in South Africa could expect such favoured treatment as Pretoria has secured, and the announcements that the S.A. Iron and Steel Corporation has to remit one-third of its profits in excess of 10 per cent. to the Railway Administration and that the public are to be invited to "put their money into the company" do not whitewash this business.

Paving the Path to the Public Purse.

This South African Iron and Steel Corporation was born into a world of promise with a fan fare of trumpets. The Government quickly sponsored the new and seemingly lusty Pretoria baby and stood as its godfather at the fount of baptism.

Both before and after flotation the project had a road paved for it towards the public purse in the *Journal of Industries*. We believe that the undertaking even found favour in the eyes of *The Seven Seas*, the organ of that admirable institution, the Navy League of South Africa.

Perhaps in the remote days of a dim and far-distant future the Corporation will be manufacturing iron and steel for South African battleships. But that is looking a very long way ahead, and what is of more immediate importance is the question of when the Corporation is going to show any signs of ability to fulfil its agreements with the Railway.

A Ministerial Statement.

Speaking in the House of Assembly the other day, Mr. Malan, the acting Premier and Minister for Mines and Industries, remarked of the Pretoria iron industry that the company had done everything, but the difficulty was finance, and as soon as more money had been raised the company would start.

We should very much like to know what Mr. Malan actually meant when he said that the company had done "everything."

"So much to do; so little done."

According to Mr. Romyn, who presided at the annual meeting held in December last, "the flotation of the company had been carried out under an agreement dated December 30 between the National Industrial Corporation of Africa, Ltd., and the Pretoria Iron Mines, Ltd. The company was registered on May 18 last with a capital of £1,500,000, and the statutory permission to commence business was issued on August 26. Altogether 350,000 shares had since been issued—200,000 to the Pretoria Iron Mines, Ltd., as consideration for their assets, including mining leases, and 150,000 shares as working capital. That working capital (£150,000) had been largely expended on the completion of the foundry, the purchase of properties and the reconditioning of the plant, and the time was not far distant when the issue of further shares must be considered."

The Dream of the South African Iron and Steel Corporation: A Big Canadian Iron and Steel Works.

It is admitted that these are exceptionally difficult times in which to raise large sums of money such as are required for the consummation of this project.

But there is certainly a great deal of justification for the criticism which is now being directed against the S.A. Iron and Steel Corporation and the Government in their business relations. The facts are that this company was registered with the imposing capital of a million and a half, and its financial stability appeared to be assured by virtue of the wealthy and strong interests associated with the enterprise.

Terms of Flotation.

It is not easy to ascertain the exact terms upon which the Corporation was floated. But a guarantee has been mentioned in the reports of at least one company which participated in the flotation.

Coke Ovens at the Pretoria Iron Works.

If the million and a half was guaranteed and underwritten, it would appear to be the duty of the Government in the interests of the country at large, and particularly in the interests of the Railways for the fulfilment of the contract, to call upon the company to provide capital to the end that the Corporation may at the earliest opportunity attain to a position which will enable the Pretoria Iron Works to make good its undertakings. Perhaps there was some protective clause in the financial agreements which renders it not obligatory for the sponsors to put up the capital upon which the company was registered. If this be so it may be asked whether it is policy for the State to enter into a preferential contract with a private concern which has not so far been able to carry out its undertakings for the manufacture of a product of which an important department of the Government has need—a product which, by the way, can be supplied by other concerns which have not had the preferential treatment which has been accorded Pretoria.

The Question of Guarantees.

As we have already remarked, we are not in a position to state definitely the allocation of capital or the actual amounts guaranteed, underwritten, and taken up.

According to Mr. Romyn, 350,000 shares had up to the end of last year been issued, leaving 1,150,000 unissued. A large block of shares—we understand the number to be 400,000—were originally reserved for overseas interests, but these have not been taken up, and at the last meeting of the Corporation it was declared to be the policy of the company to offer for public subscription in South Africa as much of the capital as the country was ready to absorb.

In the report of the directors of the Transvaal and Delagoa Bay Investment Co., Ltd., for the year ended with August 31, 1920, it is stated: The company has agreed to participate to the extent of £40,000 in the guarantee of working capital of the South African Iron and Steel Corporation, Limited.

We observe too in the balance-sheet and report of Rand Mines, Ltd., as at December 31st, 1920, under the heading of "shares, property and assets and debentures at or below par value": 18,780 S.A. Iron and Steel Corporation, Ltd., shares of £1.

The Great Pretoria Iron Industry which has not yet Materialised: Opening up iron ore on the Pretoria town lands.

Increasing Capital Requirments.

The amount of capital involved in the original scheme, of which not a quarter has been issued, has, however, now been declared to be insufficient.

The scheme favoured by English experts is a 75,000-ton iron and steel works, which it was estimated by the Chairman in December last would cost two and a half million. It may be that even that will not suffice; in some quarters it is contended that a sum of three and a half million will be necessary to complete the Corporation's ambitious programme. And there the matter rests at present.

On the debate in the House of Assembly on the Iron and Steel Contract a year ago the Government was warned that it might have cause to regret the ratification of these agreements entered into between the Railways and the Corporation and in so far as matters have progressed—or rather have not progressed up to the present—we do not think that the Government has much cause for congratulating itself over this business. And inasmuch as this is a public matter which concerns a most important department of the State, one is surely entitled to wonder how many years will elapse before the Corporation is in a position to supply any of the Railways' needs and to ask whether any of the guarantees of capital have been withdrawn.

According to the report of the Transvaal and Delagoa Bay Investment Company, that concern agreed to participate to the extent of £40,000 *in the guarantee* of working capital of the S.A. Iron and Steel Corporation, Ltd.

A Pertinent Question.

Who were the other guarantors in this million and a half venture which we are now told will require not less than two and a half millions of money?

If the Government had entered into a contract with, say, the Bantjes Consolidated to take half of its output of gold, most sane-minded people would have been tempted to point out that the Bantjes does not produce any gold. But it *may* produce gold would probably be the learned retort of our eloquent ministers.

It seems to us that this hypothetical example bears some distinct analogy to the matter which we here have under consideration. The S.A. Iron and Steel Company is not at present producing iron or steel. Yet it *may* do so. One would imagine that it would have been just as well to await the time when the Corporation was producing before committing the Railways to an undertaking to purchase half the Corporation's output, even though the Corporation was generous enough to agree to remit one-third of its profits in excess of 10 per cent. to the Railway Administration.

Iron Ores near Pretoria.

BASE METALS: LESSONS FROM AUSTRALIA.

At the annual meeting of Amalgamated Zinc in Melbourne on April 14, the Chairman told the shareholders that the plant is capable of producing 3,000 tons of concentrates per week, but is at present only averaging about 1,000 tons per week. He further said that throughout the world to-day we are witnessing the slow, relentless and inexorable operation of economic laws, the real effects of which many have been ignorant of, but all are feeling in some form or other. During the War all the Governments were stocking base metals, knowing that, without these, they could not continue the struggle. Europe and America still hold large stocks, which can be sold at a price far below cost of production in Australia, but prevailing conditions are holding up the Broken Hill industry, which is the key of the position. Until these stocks are absorbed and peace is finally restored to Europe, no hope, in the chairman's opinion, can be entertained of an improvement in the position of the base metal industry in Australia, and, what is more, this is not only true of the base metal industry, but of all other primary industries. "We must endeavour to find new bases by which present costs can be adjusted to existing needs." The chairman admits the task is not easy, but it must be tackled if Australia is to preserve the splendid national asset which these industries constitute. Mr. Baillieu bluntly asserts that this is true, "notwithstanding all that is said by people who think you can get more out of a jar than you put into it." He proceeds: "The base metal industry, as to 90 per cent. of it, in all its branches, has to live upon the world's parity price, yet there are suggestions even now that Governments should support wages over and above what industries will bear. It means we would all be feeding on one another. Men at the head of the Broken Hill mines are as anxious as the men's leaders to give the men the very best conditions and wages the industry will allow; but, if capital is not going to get any return, the spring from which existing industries are maintained and developed, and from which new industries are started will disappear." The position at Broken Hill for the last two years has been this—that the mines are incurring heavy losses, although it has been said by the president of the Mine Managers' Association that the Broken Hill mines can produce more cheaply than any other mines in the world. Mr. Baillieu only wishes that this were true. In his opinion, the fate of the industry is really dependent upon what is happening at the other end of the world.

PIONEERS OF THE TRANSVAAL GOLDFIELDS.

The main object of this Society is to obtain records relating to the pioneer days of the Transvaal goldfields with the object of publishing same in book form early next year.

Many articles and unique photos have already been received. These will eventually be edited by some competent authority to be appointed by a committee.

Further contributions and photos will be welcomed by the Secretary, Mr. J. Hunter McLea, 39 Permanent Buildings, Harrison Street, Johannesburg.

Improving Outlook for Base Metals.

BETTER NEWS FROM LONDON—MORE FAVOURABLE CONDITIONS IN AMERICA AND ON THE CONTINENT—BRIGHTER PROSPECTS FOR OUR PRODUCERS.

A feature of the London cables in the past few days has been the brighter outlook and firmer quotations in the base metal market. In the past few years the productive activity of South African mines has broadened to include almost every variety of base metal, and this country is therefore now interested in all the great world movements that govern and condition the prices of the metals. The great slump in prices of almost all primary products that marked the end of last year had, of course, an immediate and disastrous effect on our young base metal industry, and our tin, copper, lead and zinc mines were all affected to a serious degree. Work on most of these mines is now restricted to development and preparation for the day when prices will make productive operations again remunerative. Fortunately there are signs that the tide is on the turn, and that we are within measurable distance of a revival of activity in the base metal industry. Chief among the favourable influences at work is, of course, the advent of industrial peace in England and the restarting of the mining and engineering industries at full pressure. Not all at once, of course, but gradually, we may expect the demand for the metals in England to increase with this revival, and the fact that contemporaneously with this revival the news from America and the Continent is also most favourable gives ground for hope that things are now definitely on the mend. Something about industrial conditions in those two important quarters of the world market may be of interest.

View at the Edendale Silver-Lead Mine.

Improvement in the U.S.A.

The *Morning Post* New York correspondent states that New York bankers believe that when the violent liquidation of frozen credits in connection with financial year-end settlement on 30th June ends and interest and dividend payments due on 1st July are released, the atmosphere will greatly improve. In such quarters it is expected that commodity prices will shortly become stabilised around present level in anticipation of better business in last half of the year, but at present it is realised that markets for the exchange of securities, money, and merchandise are all tied up, together with frozen commercial credits, in the middle of a badly tangled knot. The point is that the second half of the year is expected to see a big improvement.

Changed Outlook in Russia!

The best news of all, however, comes from Russia. It seems that industry is about to revive there, and if that great market is again thrown open to the world, the demand for all base metals to resuscitate its industries must be colossal. In an interview in the London *Sunday Times*, M. Krassin declares that " in the last few months a great change has taken place in the body politic of Russia." Moscow now finds it necessary to enter into trade agreements with capitalists all over the world. Britain's example they wish to be followed by France, the Scandinavian countries, Italy, and America. Already, as far as foreign trade is concerned, private ownership and private property are recognised. Moscow has created the essential elements of a new bourgeoise, without the fundamental evils of the old, and with a stern democratic control. Russia at the present moment welcomes a foreign capitalist, and this policy finds its immediate and purely economic expression in the new policy of concessions. Interviewed by *Petit Parisien*, M. Krassin made other interesting declarations in regard to the change in Soviet policy. He admitted, as Lenin has himself admitted, that a general revolution is at present unlikely to break out in Europe. Therefore Lenin " is changing his tactics, and by reason of the international situation as well as of the economic collapse of his country has decided to come to terms with the internal opposition —the peasants—and with the external opposition—the capitalists—instead of seeking to crush them." M. Krassin admitted that the Russian peasant was never a Communist, and never would be, for sake of the *beaux yeux* of the

On the Road to the Messina Copper Mine.

Moscow Government. The " new method " is to treat him with kindness, supply him with agricultural implements, manufactured articles, and Western civilisation in order that they might understand the practical advantages of Communism. To effect this, says M. Krassin, Russia must have the material assistance and technical help in the shape of specialists who are able to exploit its great riches. Asked how the Soviet could convince capitalists that the process of expropriation would not be repeated, M. Krassin, among other reasons, said that " Nobody can imagine the existence of a more radical Government than ours. If we are overturned it will be by a Government of the Right, which would certainly endorse any engagements we might have taken.'' M. Krassin definitely states that many concessions to foreigners are contemplated, but that only one has so far been granted—to a Swedish firm. He believed that in a short while a vast international consortium will be formed to work the rich resources of Russia. The correspondent adds that he found M. Krassin prepared to make purchases in France and to discuss the acknowledgment of Russia's debt to France.

Germany in the Market.

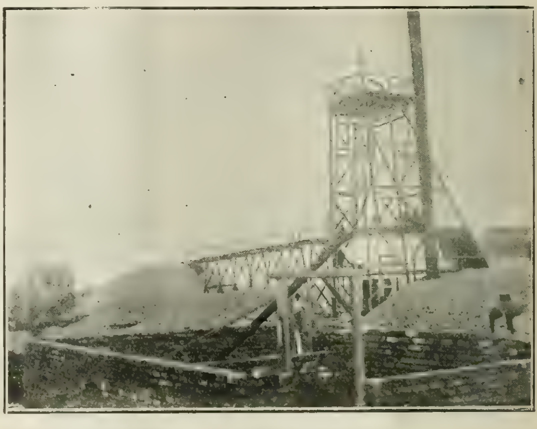
Germany, of course, is also a big buyer of all raw materials, notably base metals, and has made extensive purchases in the American open market of late. To particularise the following may be noted, under the heads of the chief base metals:—

View at a Transvaal Tin Mine.

Copper.

It is understood that 200,000 tons of copper have been sold by American producers to Germany, and whilst definite confirmation of this sale is still lacking, yet there is every probability of the information being accurate. This sale, however, does not improve the position, much as it was expected that Germany would be a large buyer, and now that this outlet has been closed, the position is not much further advanced. It is understood that there are at least 400,000,000 lb. of copper still available in America for sale, and the disposal of this is being controlled in the Copper Export Association, which was formed in the U.S.A. for the purpose. It represents a large number of producers, and has purchased from them the quantity mentioned above for resale to foreign consumers only, at a price of not less than 12½ cents per lb. (equivalent to £71 per ton at the present rate of exchange and £59 per ton at the normal rate).

It is expected that the monthly current production of U.S.A. will be reduced by 10,000,000 to 15,000,000 lb., bringing it down to 80,000,000 to 85,000,000 lb. By these means the producing companies, through the operations of the Copper Export Association, expect to liquidate the stocks without further interfering with the present operations of the companies. Since the foregoing was written, cable news to hand states that 30,000 copper operatives are out of work because of the closing down of the Anaconda and other great mines in the state of Montana, from which it can be gathered that the operations of the pool have not been as successful as anticipated, rendering necessary the further curtailment of production. In connection with the reduced consumption of copper, Mr. Ivy L. Lee, in an address before the New York section of the American Institute of Mining and Metallurgical Engineers, gives as a reason the lack of publicity in creating and maintaining a demand for the red metal He refers to the publicity campaign undertaken by the manufacturers of other metals and alloys, e.g., aluminium (which twelve years ago was a drug on the market), Armco iron, Monel metal, etc. He presents a new point of view in respect to the effect of the war on the present prices when he says: " While such a war as that just ended creates a tremendous demand for copper, it must be remembered that while it lasts it takes the metal entirely out of ordinary commerce. So when the war is over copper has got to work its way back into general use, and it always finds a host of rivals that have flourished in its absence, ready to give it battle.'' He goes on to say that admittedly copper is the best material for kitchen utensils, and yet 50 per cent. of all such articles sold in the United States are made of aluminium, 25 per cent. of enamel ware, 19 per cent. of iron, glass and monel metal, and only 6 per cent. of copper. All through the industries galvanised iron, steel, zinc and plastic materials have been substituted for copper in roofing. Iron has been substituted for brass, and steel for both copper and brass in automobiles.



View of Surface Plant, Transvaal Silvers.

Tin.

Production has been greatly curtailed and there has been an improvement in the outlook for this metal. It is understood that altogether about 10,000 tons of tin are held in the East. It is expected that the Malayan production will decrease 50 per cent. unless prices recover in the near future, as none of the Chinese mines and only a few of the best equipped mines can make profits at the present price. The production of Banka tin in 1920 amounted to 3,994 tons as compared with 12,044 tons in 1919. We recently quoted a well-known firm in the metal-broking business; having branches all over the world, as saying that a call option on tin was bound to prove a remunerative speculation in the near future. The latest reports from the East show that the production of tin has decreased considerably, and that the reduced output is being disposed of at the current prices, but the stocks of the F.M.S. government and of the Netherlands Indies are being held for higher prices. It is understood that the stocks of Chinese tin amount to 4,000 tons, the shipments during March being only 100 tons—25 tons to Great Britain and 75 tons to the United States.

Zinc.

According to the "Metal Bulletin," the outlook for electrolytic zinc is a rosy one, as it will now be possible to manufacture alloys of copper, aluminium and zinc which have good rolling and tensile properties. The demand for ordinary distilled metal has practically ceased, and users are prepared to take the electrolytic metal, notwithstanding the increase in price of 2 cents per lb., and in view of these factors, it is considered that the industry in America will be saved only by the scrapping of the distillation plants and the adoption of electrolytic methods. It must not be overlooked, however, that the quantity of electrolytic metal coming on the market is continually increasing, and with a general change in America it is quite likely that the premium ruling for electrolytic zinc will disappear, and it has yet to be proved that the cost of producing electrolytic metal is lower than that of distilled metal, taking into view the relatively low recovery of the electrolytic process.

Lead.

In a recent issue we described the greatly improved outlook for silver, and it may here be noted that lead is also enjoying firmer quotations on the home market. These facts, of course, all govern the profit-earning capacity of our new silver-lead producing industry, and no apology is therefore needed for reviewing in detail the world conditions upon which the quotations for these products of this country depend.

Tin and Copper—Latest Mail Advices.

The last mail brings the following account of the tin and copper markets:—

Copper.—Messrs. James & Shakspeare, Ltd., report as follows:—Statistics issued to-day show a decline in imports into the United Kingdom of 4,183 tons to 7,230 tons, but an increase in the warehouse stocks of 1,160 tons to 19,465 tons. This is, of course, the outcome of the coal strike and the check given to consumption, though the difficulties attending the lack of coal have been partially surmounted by the use of oil. For certain purposes, such as annealing, reheating, etc., this will probably become permanent. Standard has been a slow market this week, with a great lack of life in dealings, although the turnover is not bad. Speculative interest has become of small account, and there is less urgency in the want of cash warrants. Business in large part has been the liquidating of July prompts, but there has also been a certain amount of professional selling in three months. The position in America does not appear to improve. Production, though reduced, is still in excess of consumption; strikes and general labour difficulties all the world over do not make for recovery in trade, though there must be a great deal of business waiting on the re-establishment of normal conditions. The outlook is still obscure, and there are not many encouraging features, although the price of this metal is really quite moderate. Standard closes dull and 22s. 6d. lower than on the 10th inst. Cash, £71 17s. 6d. to £72; three months, £72 2s. 6d. to £72 5s.; turnover, 2,350 tons.

Tin.—America has been buying again, and this is evidenced by the resumption of sales in the East, where, after a small quantity had been sold at £169, bids of £170 10s. to £171 were refused, to be followed by moderate sales at £173 to £174 yesterday and to-day. In this market activity has diminished considerably, and the turnover this week was not much more than half that of last week. Transactions have been mostly adjustments in intermediate dates, with speculative interest on a diminishing scale, but the prospect of an immediate settlement of the coal strike brought out a better inquiry from consumers, and South Wales has bought recently, both for early and forward delivery; in fact there has been a much better inquiry for cash and near dates than has obtained for some time, though this has not been quite strong enough to take care of all that is offering, so the contango has widened again, now standing at 50s., after reaching 60s. at one time. Tinplates, especially for prompt delivery, are rather firmer, and August delivery can be bought at about 2s. under near. The works expect to resume operations immediately after the end of the strike. During the week prices moved up well, mostly on buying made in anticipation of the termination of the strike.

Swaziland Tin, Limited.

The following are the results of the operations of this Company for the month of June, 1921:—

Concentrate recovered	25½ Tons
Estimated net profit for the month, including credit adjustments on previous shipments (taking Tin at £160 per ton)	£322

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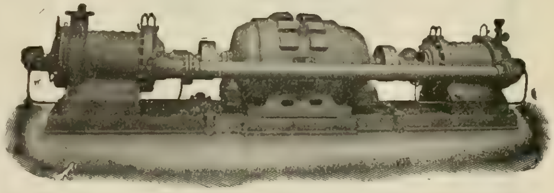

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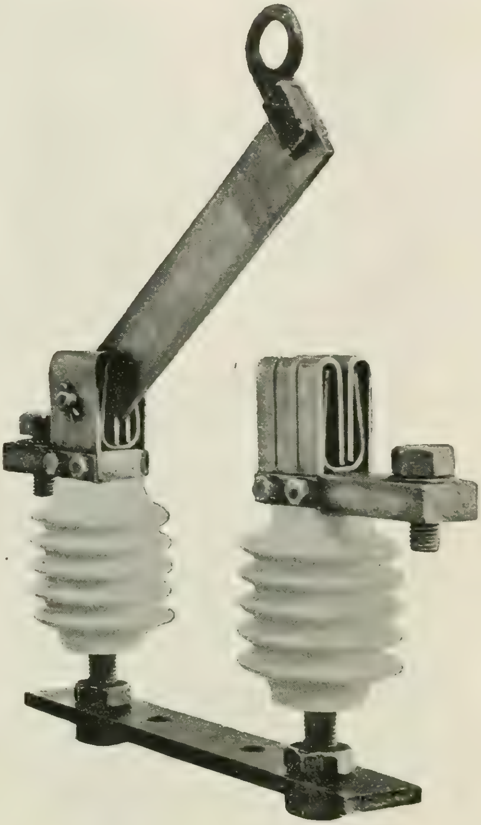

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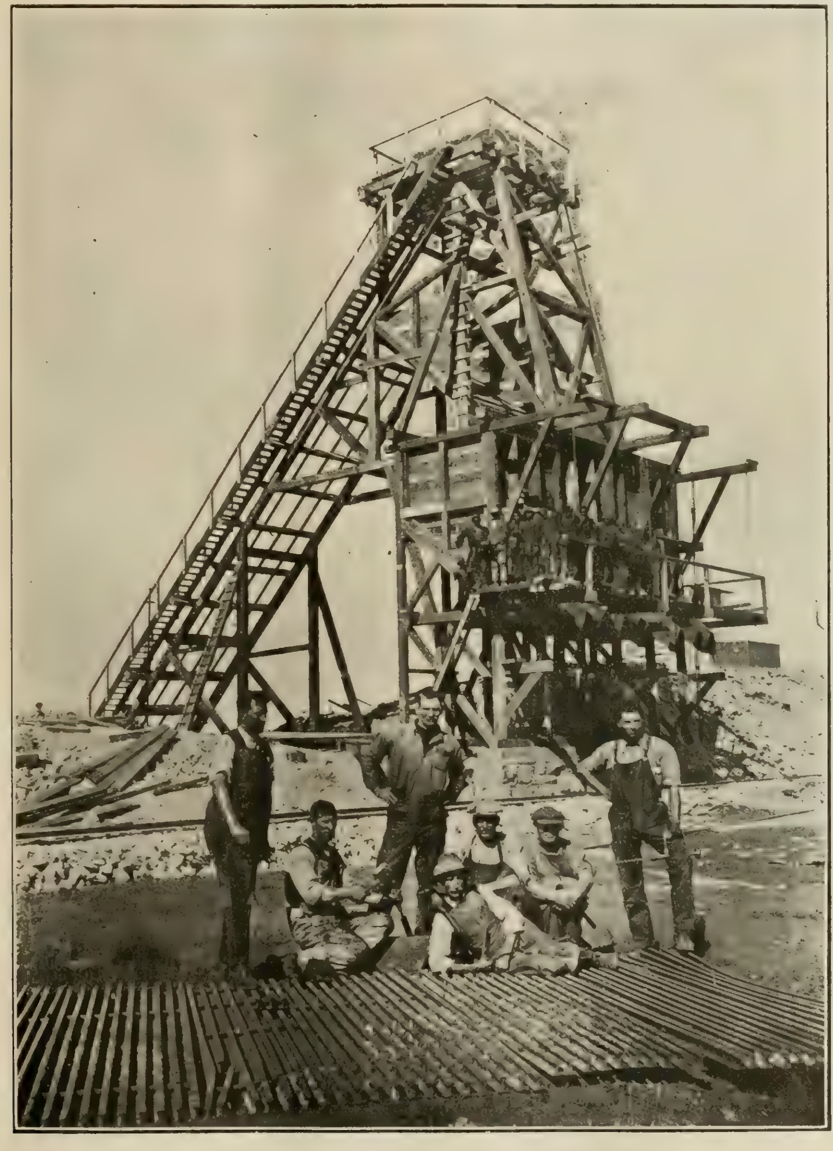
xii
"Southads."

Improving Outlook on the West Rand.

FINE PROSPECTS AT RANDFONTEIN—SOME INTERESTING PHOTOS—THE SHAFT AT GEMSBOKFONTEIN—LUIPAARDSVLEI BORINGS.

Although the West Rand has been out of favour for a number of years signs are not wanting that the section west of the Witpoortje break has immeasurable possibilities, and the probabilities are that during the next few years there will be a very considerable revival of activity in the Krugersdorp and Randfontein areas.

The keystone of the whole industrial edifice "out West" is Randfontein, and there can be but little doubt that this great, and hitherto disappointing proposition, has at last turned the corner and will in the near future be earning even more substantial profits than were recorded in respect of last month's operations. Prosperity at Randfontein will have as a consequence the focussing of a great deal of interest on a portion of the Witwatersrand gold fields which has, so far, not come up to expectations. In several recent issues of this journal we have published photographs depict-



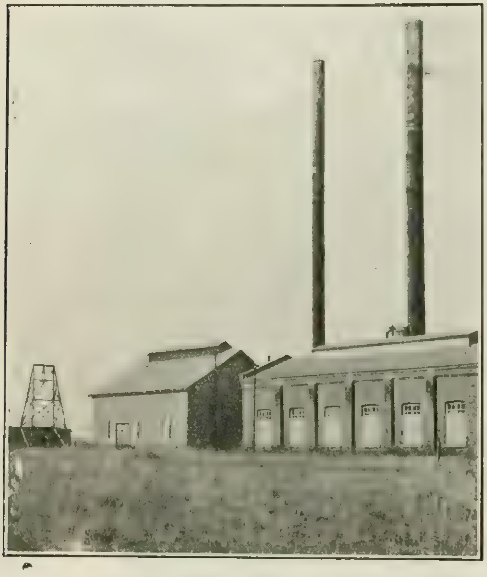
The Lindum Shaft, Randfontein Central.

ing the rejuvenation of the Colossus of the West Rand, and we give herewith a new picture illustrating the recently completed Lindum headgear on Randfontein Central, which is an important point of attack in the scheme of opening up the overlying reefs.

Boring on Luipaardsvlei No. 10.

We give herewith, too, a photograph of the buildings at the Gemsbokfontein shaft of the Western Rand Estates, a proposition of tremendous potentialities, which, on account of lack of capital, has not yet attained to the developing stage, in spite of highly satisfactory borehole values.

Another photograph illustrates boring operations on the farm Luipaardsvlei No. 10, which lies to the south of Randfontein, and on which the Coronation Syndicate has been diamond drilling with satisfactory results.



Headgear and Buildings, Western Rand Estates.

Congo Developments.

The latest news from the Congo, which comes to us from Brussels *via* London, is to the effect that the Union Miniere has increased its capital from fifteen to twenty million francs, and is to make an issue of preference shares. A large hydro-electric power scheme is to be installed, and the output of the copper mines is to be increased within 6 to 7 years to a total of 100,000 tons per annum. Its output last year was 18,897½ tons. Radium and uranium have been discovered in the territory. A cement works to turn out 15,000 tons of cement a year is to be started. New rolling stock has been ordered for the lower Congo railways.

Letters to the Editor.

OUR LETHARGIC LEADERS OF INDUSTRY.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—It has been a great pleasure to your many readers, myself included, to read your outspoken articles in your journal relating to "The Land without a Leader" and "American Capital for South Africa."

I should like to place before you an example of the lethargic enterprise of some of our present capitalists; take for instance the Welgedacht Exploratory Company, who own a farm of 2,585 morgen about 5 miles from Springs on the Witbank Line. The reef has been proved on this property by a borehole, giving the assay value of 1 ounce 6 grains to the ton over a width of 10 inches, so that shows the reef is there. A shaft was started but stopped at 724 feet owing to water troubles; the depth of the borehole was 1,900 feet, the same as the Geduld property; there is also coal on the farm, which has been worked and closed down.

Now, sir, here is an opportunity for capital. I believe that the Company has about £100,000 cash in hand or invested, out of an issued capital of £156,750. The property is in the centre of the favoured zone of the Far East Rand, but is idle through want of enterprise and capital. —Yours faithfully,

SPRINGSITE.

THE GROOTFONTEIN BOREHOLE.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—Touching the "Boring on Grootfontein" published in your last issue, the statement is made that the bore passed through 437 feet of Kimberly shales, and that at another 1,000 feet or so "Main Reef Leader" should be reached.

Now, sir, considering that there is no greater thickness of shales in the Kimberley series than would make a decent sandwich, and the Kimberley series overlies Main Reef series by 1,700 yards, I leave your readers to work out this little bit of stratigraphy for themselves.—I am, etc.,

SCOTT ALEXANDER,
"Rand Stratigraphist."

Johannesburg,
July 20th, 1921.

The Wage Question.

Mr. H. F. Marriott has something to say on the white wage question in his annual report to the Central Mining Corporation, and he says it very forcibly. He writes:—"The European wages show an increase of 92 per cent., which is out of all proportion to the remainder of the increases noted, and the anomalous position has been created that the total cost to the industry of the European employees, who largely act in a supervisory capacity and constitute one-eighth of the total labour force, is nearly double the whole expenditure on the native labourers who carry out the work. It is evident that this item of cost of European labour must be considerably reduced if the mines are to continue in successful operation. Any successful reorganisation of the present system of underground work must of necessity include the amendment of the onerous and obsolete mining regulations, which unduly restrict the hours of work of the native labourers to as little as five hours daily, and prevent their legitimate development to higher classes of work. The attainment of the reductions of cost here indicated will, apart from other possible sources of increased profit, go far to re-establish the stability of the industry, and will in turn induce the enlargement of the scale of mining operations, and thus afford increased scope for legitimate application of European labour in the mining industry and in kindred commercial undertakings."

The "S.A. Mining Journal's" Essay Competition.

TWENTY-FIVE POUNDS PRIZE GOES TO MR. JOHN MOORE, CROWN MINES—SOME PRACTICAL POINTS WHICH BEAR ON ECONOMY AND EFFICIENCY.

The following has been adjudged the best essay submitted in connection with the Prize Essay Competition promoted by the "S.A. Mining and Engineering Journal." It will be remembered that a prize of £25 was offered for the best contribution on the subject of "How to Reduce Working Costs and Improve Efficiency in and on the Mines of the Witwatersrand." Out of a large number of essays submitted, eighteen essays were eventually placed before the Adjudication Committee, and after a careful scrutiny of each individual effort, it was decided that the essay forwarded by

MR. JOHN MOORE,

Box 103, Crown Mines, Ltd.,

is the best. A cheque for £25 is accordingly being forwarded to Mr. Moore, to whom we tender our congratulations. Two or three other competitors forwarded essays which it is intended to publish either in full or in respect of portions in this journal, and payment will be made for such essays or portions thereof on publication. In making this notification we desire to tender our thanks to Dr. W. A. Caldecott and to Mr. Hildick Smith for the services which they so kindly rendered as adjudicators.

Mr. Moore's Winning Effort.

There is no one thing that will so cut the cost of production that the low-grade mines will resume work at once. However, a lot of small reductions will so cut the costs of the mines at present working that the mines now closed down will be able to resume work, slowly at first, and later on to open up on their former scale.

A. Surface.

1. There is an immense amount of scrap iron and steel that could be remelted to produce pig iron, either for mine consumption or for sale.

One blast furnace for the group would probably be sufficient.

That it is possible for a group to make all their own castings, including special alloys for stamp shoes, etc., has been proved by the Calumet and Hecla.

2. Overlapping authority and petty foremen must be got rid of.

3. There are mines here to-day with a comparatively small tonnage with surface costs of 4s. per ton. Others with large tonnage and surface costs of 7s. per ton.

This disparity of costs is startling.

B. Underground.

1. The repair of worn tools should be undertaken to a greater extent than is at present practised.

Shovels, for instance, could have the blades patched when worn, and broken handles replaced by ¾ in. or 1 in. pipe. One end of the pipe can be split and a rivet put in to form the usual D grip. For actual shovelling these are not as good as a new shovel, but for the scraping that is usually done they are just as good.

Pipes to be cut and threaded and old taps and valves to be brought to surface, cleaned up, and repaired. New issue should be given only in special cases unless old gear is turned in with the order for new.

2. Axes and saws, etc., should be exchanged for sharp ones as soon as dulled. This should be done at an underground store, as the delay is often several days before tools left on a station are brought to surface. In the meantime they are rusting and there is the chance of them getting lost.

One saw at the present price would pay for a boy two hours per day for a month, to say nothing of the inconvenience caused.

3. Timber is one of the heaviest costs, especially on the Central Rand. This may be cut down, especially in low stopes, in hammer and reclamation work, by the use of old heavy-section rails in place of sticks as foundations for waste packs.

They must be well hitched into the foot and have head boards.

At present I know of several that are bent at an angle of 45 deg. and are still holding.

A platelayer can cut them to the timberman's measurements in a very few minutes.

4. Instead of the universal lagging old pipes may be used across the rails in place of a backwall.

5. When travelling ways must be kept open, especially when the ground is very heavy and the height not more than 6 ft., waste packs may be built as follows:—

A layer of stones carefully packed about one foot thick, then across this old hauling rope unravelled and the strands cut to such a length that they reach twice across the pack with the ends away from the travelling way. These are placed about one foot apart. Another layer of stone, and this time the strands are laid at right angles to the first.

These so bind the pack that it will crush to about two-thirds of its original height without bulging. The ordinary pack will crush very little before bulging.

6. There are many other ways of saving timber, reclaiming some distance from the faces, etc., that are used everywhere, but the two above are not in common use on the Rand.

Kroonstad Coal Estate Company, Limited.

TENDERS FOR TREES.

TENDERS ARE INVITED and will be received by the undersigned up to and including Saturday, the 30th day of July, 1921, for the purchase of approximately 2,000 Growing Gum Trees, suitable for Mine Props, on the above Company's farms, Vierfontein and Swartfontein, O.F.S., near Klerksdorp.

The successful tenderer will be required to cut and remove the trees at his own expense.

On application to Mr. H. C. Webster, Vierfontein, every facility will be given to intending purchasers of inspecting the trees.

The highest or any tender not necessarily accepted.

Further particulars may be obtained from—

SALISBURY, BEATON & RAYNHAM,
Secretaries.
P.O. Box 245, Kimberley.

Kimberley, 6th July, 1921.

7. At present the native labourer spends on an average of two hours per day in a prescribed waiting place till his boss takes him to his working place.

In bad ground it is admitted that a white man should always be present, but in the average stope a timberman or trammer could inspect the working-place, start the boys, and then go to the more dangerous places where constant supervision was necessary.

These men would go down, say, two hours before the ordinary shift.

This would allow about two hours extra working time for the natives at no additional cost to the mine. It would also solve the native labour shortage.

In the case of hammer and machine boys, they would not be allowed to drill, but could lash benches, set up, and generally get ready for the day's work.

8. The items discussed above all influence the cost of production, but the most important of all is to give the day's pay man an added incentive to put his head and back into the work.

This alone will restart every low grade mine on the Rand.

A man working for himself will do twice as much as a man on day's pay, and do it easier. To cut the day's pay man's wage, no matter what the excuse, most certainly will not do it, and, on the other hand, a glance over the cost sheets of American and Canadian mines will show that, conditions being equal, the mines that pay the best wages have the lowest labour costs per ton.

The bonus scheme here given is working successfully in a number of places.

The usual guarantee or day's pay is given, and a bonus is given for points above a certain set standard, and debits for below that standard.

The standard would be set for each mine captain's section, or, if possible, to keep the tonnage separate, for each shift boss's section, and would be based upon tonnage (skip or haulage), grade (sample office), native and white efficiency.

The tonnage and native and white efficiencies could be taken as an average per day for, say, the three months previous to the adoption of the scheme.

The unit of tonnage might be taken as 1,000 tons, the efficiency unit as one ton, and the grade unit as one dwt.

This would require some slight modification in exceptional cases, such as in a section which was just being opened up or where several stopes were stopped simultaneously.

This only applies to the day's pay man; the contractor would not benefit by it in any way.

The day's pay man would get his bonus cheque some time after the first of the month.

By making every man virtually a contractor you are sure of his best work, and no man would see another loaf if his own bonus cheque was imperilled, no matter what the union said about it.

9. Another change that would make a difference on the right side is to give the shift boss his old control over his men.

The Chamber of Mines did a big thing when they took the power out of the shift boss's hands. Admittedly it was abused at times, but if they had to go underground as shift bosses to-day and keep up the standard they expect shift bosses to keep up, there would be a change before night to the old way.

Increase or decrease of working costs and native and white efficiencies are the true indications of its success, and a glance, especially at the latter, will show it has not been a success.

Victory Bonds v. Premium Bonds.

There is an obvious moral in the following paragraph taken from the *Financial News* in mail week: "There was an interesting little gathering in the Bank of England parlour at noon on June 25th, when there was a "draw" for Victory Bonds. These bonds were quoted at about £77, but the holders of lucky numbers were promptly bought out at par—a nice little profit of £23 per bond. The winning numbers were published in the *London Gazette* on July 1st." If Victory Bonds with all their speculative attractions are permitted in England, why, we may ask, prohibit premium bonds?

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Reminiscences of the Early River Diggings.

THE RIVER BEFORE KIMBERLEY WAS DISCOVERED—FLOODS AND ADVENTURES—SOME PROMINENT PERSONALITIES.

(By W. P. Taylor.)

In a previous article I mentioned the awful flood in Victoria West. In all the nine months that I was there it was perhaps the only eventful thing that occurred. I remember old Louw Snymann and his wife—great, portentous, heavy farm people. He owned the principal farm, and Mr. James Fergusson, the intruding merchant, had made up his mind to have his wool. There was a large cask of sweet red wine, and regularly every day the old couple used to waddle in, and no bones about it, suggest to Fergusson that they should make a "kleine schnapschletje," and thinking of the wool he gave the bees the syrup. But alas for human frailty, Harman and Hoffa got the wool. There was a Dr. Bird at Louw Snymann's, a Doctor of Laws, quoting sonorous Latin and teaching old Louw's sons. It was at this house that a friend of mine mended the grandfather clock, as we proceeded to Pniel, and the inside of the grandfather lay on the large table and was not put together until the horses had had a good four days' rest and eaten enough of old Louw's forage to put them into working fettle.

A Great Flood.

The flood released me from a three years' apprenticeship at £2 a month, it gave me £3, which Mr. Palgrave, the commissioner got from the Relief Fund, and I paid this to get up to Pneil. I literally went up in my shirt and trousers. Looking back at the awful night of the flood, I can remember the sky being overcast with great, heavy black clouds, and when the sun set there was no redness; the lightning flashes showed the heavens in a seething whirl, and ominous deep thunderings all around. The very natives were awestruck. After dinner I was calling over from the day book to my employer, who was entering the accounts, when the terrific lightning and thunder caused him to close his book and lock the safe, and then he told me of a flood where the water had come in a foot deep in that same room. Just then, I looked at the door and saw water spirting through the keyhole. The door must have been unlatched for it gave way and let a volume of water in that took the glass casement door, at the back of us, with it in no time; the table floated, the lamp was upset, and we were in six feet of water and darkness. Then we heard human beings shout for help, and saw, in the flashes, animals being swept past. We knew there was nothing short of a miracle to save us. Of the people under the water-line, 112 were drowned and about twelve were saved. Mr. and Mrs. Kossuth, who afterwards became old Kimberleyites were up a chimney with their two little girls. Mrs. Toby Coronel, of this town, was one of them. The saddest thing that I remember was a Miss Dodds, in an adjoining house. The water was not so deep there. She was a very handsome girl, the belle of the town, and engaged to a promising lawyer. The couple were standing on a table near the chimney. In the lightning flashes he saw her looking down in the water. He heard a piece of brick drop and splash, then he felt her weight on his arm, and eventually, feeling sure she had fainted, he shouted out to the sister, who was on a table nearby. They could not get a light, but eventually they carried her to safety and found her dead. The piece of brick had fallen on the spine, behind her head, and dislocated it with but a touch.

This great cloudburst must have been terrific in its volume, for the river was swollen for days and large quantities of stock and goods were washed into the Orange River a hundred miles away, and from thence into the Atlantic Ocean. A rock, hundreds of tons in weight, was washed from the mountain's summit into the town road. It testified to the waters having been 400 ft. high at the poort's entrance.

When I was taken half-frozen to Mr. James Fergusson's store Mrs. Fergusson gave me a glass of hot wine, and I was put into Mike Kenedy's arms, who warmed me to life. Kenedy in after years was secretary to the Rand Club, and afterwards Master of Records at Salisbury.

We left Victoria West with a waggonette and four horses for Pneil with Valerian Litkie, Mrs. Litkie, the baby, and two drivers. After twenty weary days, during which the horses were changed for mules, that slowly, but incessantly, dragged us for days and days through slippery mud, these were again exchanged for a team of donkeys. Slowly but surely we were nearing our goal, and after twenty days of loathsomeness one morning a very smart turn-out came towards us, and a mighty swell, with flowing whiskers, the Baron von Kraut, shouted his welcome and drove my friends home. I was left to bring in the waggonette, which duly arrived in Pniel the next

Typical Vaal River Diggings, near Delpoort's Hope.

A photo taken many years ago.

morning. Then, wonderful to relate, just as it landed at its owner's door, I saw the man I had hoped to meet at the fields, and I immediately went with him. I was very small, I could sleep on a coat, on a wagon-box, and that was my first bed in Pniel.

Let me tell you of my friend. He was a fine specimen of a Colonial and his name was Edward Gray. He had his claim, his tents, his Colonial servants, and he owned a store. He was kindness itself to me and things prospered. At Kimberley he became wealthy, the world afterwards tossed him about, and after fifty years he now finds himself back at the selfsame river. Last month he found an 8-carat stone, he lives on hope, and still thinks he will find his fortune amongst the agates and bantums of river gravel, and for all his kindness, and fifty years of friendship, my hopes and wishes are with him.

Barkly West.

In another chapter I will tell of Herbert Rhodes's arrival at Colesberg Kopje, Klipdrift. This place is now known as Barkly West. On my arrival I was most anxious to see how men found diamonds, and I looked wherever I went in the hope of seeing one. Whatever I saw shine I picked up, agates and crystals, for I was on the warpath and meant to miss nothing. I found no diamonds. I found plenty of work. I had to put in my day somehow, and I always volunteered to do things, which amused the men a great deal. One day I went fishing across the river. There were some high trees, and in their topmost branches I saw layers of reeds and sticks. This puzzled me a great deal, and seeing an old Koranna I asked him how they came there. "Well, my young master," he replied, "many white men see those reeds and never trouble to know about them, but, my master, they were put there by the river when it was very, very high many years ago. I was here, and many people lost their huts that were near the river." This bit of information gave me a shudder, and I told the old man of the flood that I had just been in. Three years afterwards Jappe Vilgee (de Villiers), a friend of ours, from the Cape, built a great brewery on this very spot. My father, brother, and myself walked over from Kimberley and stayed with his manager, Piet Richter. Peter Volsted was in charge of the brewery. I told both Richter and Volsted of the reeds in the tree tops and the danger of the brewery being washed away. They laughed at the idea. Within a few years afterwards the river came down and not a vestige of that brewery was left. It was a great pity, for the loss was very heavy and they made excellent beer.

RAND WATER BOARD.

NOTICE No. 85.

VAAL RIVER SCHEME.—CONTRACT No. 209.

TENDERS ARE HEREBY INVITED for the supply, delivery and erection at the Board's Main Pumping Station, Vereeniging, of:—

Two Steam-driven Electrical Generating Sets of 350 K.W. capacity each, complete with Switchboards and all Accessories.

For particulars apply at the office of the **Chief Engineer, Rand Water Board,** where copies of the Contract Documents may be obtained **on and after Monday, the 25th July, 1921,** upon a deposit of £5 5s. per copy, which amount will be returned on receipt of the documents and a bona fide tender. Additional copies of the documents may be obtained on payment of £1 1s. per copy, which amount will not be returned.

No tender will be considered unless accompanied by the deposit referred to in the Form of Tender.

The Board is not bound to accept the lowest or any tender, and may, if it so desires, divide the contract between two or more tenderers.

All tenders are to be deposited at the Office of the Secretary, Rand Water Board, 2nd Floor, Central House, or P.O. Box 1703, Johannesburg, before **12 noon on Monday the 7th November, 1921.**

W. INGHAM, M.Inst.C.E., M.I.Mech.E.,
Chief Engineer.

Johannesburg, 20th July, 1921.

There was always relaxation on the river. We had a boat and every Saturday, with Michael Freshlich or Gray, I would go to gather a load of wood, and there was shooting, and buck and guinea fowl went to the larder. Hearing that Gong Gong and Cawood's Hope were better places, we went there. I met S. van Breda at Cawood's. He now has a beautiful home at Wynberg, surrounded with vines. I wonder if he ever thinks of swimming across the Vaal, in the nighttime. It was a simple way of keeping cool in those days. At Gong Gong our party found a 44-carat stone. We only worked down 6 ft. I hear they have since gone down 100 ft. and found wonderful rich gravel. We left it for De Beers, but before I went to De Beers our party rushed to Delport's Hope, at the junction of the Harts and Vaal. There I met Henry Glynn, father of Henry Glynn at Sabie. He had several sons and he gave up diamonds for the Sabie, for he made his home in those beautiful Lydenburg hills, and he hunted big game. I wonder if any of the family remember Delport's Hope? We had plenty of shooting at Delport's—diamonds nil! It was a dreary place and I spent most of my time there fishing. I cannot say I was sorry when I found myself one afternoon in a Cape cart with four horses, trotting off to De Beers.

FIRES IN BRITISH SHIPS.

The British Board of Trade has had a report and analysis made of the fires on British ships. One hundred and fourteen cases were investigated, and reports made on all cases that occurred between August, 1919, and July 31st, 1920. The list of cases described as being due to "spontaneous combustion" shows that Natal and Transvaal coal figures in comparatively few cases. The complete list serves to remove the wholly erroneous impression that South African coals are more prone than others to cause spontaneous combustion. Out of 71 ships set on fire by this cause only seven were using Transvaal or Natal coal. Of these seven two were described as Transvaal, one as South African, and the remainder as Natal.

Speaking at the last meeting of the Transvaal and Delagoa Bay Collieries, Mr. Black, the chairman, stated: The Transvaal Coal Owners' Association, of which your company is a member, disposed of 6,567,485 tons of coal, compared with 6,081,018 tons in the preceding year. When the three factors, collieries, railways and harbours, can deal with greater tonnages than is possible at present, doubtless the Association's activities will also expand. They have done everything in their power to attract customers from overseas, and I feel it my duty to point out that the coal industry, which needs considerate treatment by Government if it is to prosper and expand, has reason to complain that, during the year, the increases in the rates for the conveyance of coal on the S.A. Railways for shipping and export purposes have been excessive, and were often suddenly sprung upon the collieries at a few days' notice.

The past year has been one of recurrent negotiations between the employees on the collieries and the employers, on the matter of shorter hours and higher wages. I regret to say that the good spirit of former years was sometimes not so evident on the part of white employees and their unions. Whilst there is the utmost desire on the part of employers to compose differences by the method of mutual reciprocities, the constant fresh demands made by Labour check the expansion of industries and tend to create unemployment.

The Search for Oil in the N.-W. Cape Province.

EXCITEMENT IN THE DISTRICT—OPTIMISTIC VIEWS REGARDING THE OILFIELD.

[The excitement in the Carnarvon district engendered by the belief that oil had been found there has been damped by the unfavourable report of Dr. Wagner on the Carnarvon borehole. A correspondent portrays in the following article the feeling in the district prior to Dr. Wagner's report. Naturally, the people chiefly concerned are very reluctant to believe that Dr. Wagner's views are correctly represented.]

A special correspondent of the *Cape Times* has been visiting the Carnarvon district, and writes as follows regarding oil prospects:—

Throughout this north-west corner of the Cape Province—the wild and woolly North-West—the word speeds from mouth to mouth. It runs with incredible rapidity from Hutchinson to Calvinia, and from Calvinia back to Hutchinson, gathering fresh impetus every time it passes the great generating station of optimism—which is Carnarvon. It gives a strange excitement to life. It is a passport to the confidences of the cautious and reticent men who inhabit these far-ranging wastes of the Karoo.

" Have you come to see the oil? . . . Yes, the Oil Belt. . . . I hear they've struck. . . . No? Well, they're just going to . . . Things will step lively. . . How many shares are you getting?. . . So I hear. . . . Piet sold an oil option on his farm yesterday . . ." And so the tongues wag.

I have caught many such snatches of conversation during the last few days. If you see a group of Karoo farmers at the tail end of Hutchinson platform betraying open curiosity at the presence of strange City men, you can safely wager they are talking oil. If one approaches you to pass the time of day you find that before he has tethered up his first sentence, the word " petroleum " has slipped out somehow. Even if you go to a bank to test the strength of your overdraft someone there will be whispering " Oil." Predikants mention it reverently. The telegraph wires hum audibly with it. Infants are suspected of lisping it in their slumbers. You hear it everywhere. " Oil!"

There is an air of great expectancy about the Karoo. Financiers are here; experts are here; bank balances are anxiously inspected; men in motor-cars dash about remote vleis snatching up options. In fact, all the elements of an Oil Boom are visibly present, except the most essential of all—the oil itself; and the existence of this, in anything like commercially payable quantities at least, has yet to be proved.

Oil in the Rocks.

Oil of sorts there certainly is. At Dubbelde Vlei men will break a lump of dolerite for you, and you can see for yourself the presence of small globules of oil in the stone. But it is a far cry from this surface rock to the great " lake of oil " that is popularly supposed to occupy a considerable area of the earth's crust in this wild and desolate spot, where a solitary iron derrick looks questioningly down upon a still more solitary farmhouse, as if to inquire why either of them should be there, and a small band of undaunted men—weather-hardened, cheery, full of faith—carry on gallantly an enterprise that has been nearly a quarter of a century in the making.

The borehole that has been sunk beneath this derrick has already passed through 4,610 feet of dolerite, shales and granite without rewarding its makers with the rich " strike " for which they have been hoping. Certain encouraging symptoms have, it is true, been recently forthcoming, and these, as I have already reported in an earlier message, are now being carefully examined by an expert sent post-haste from Pretoria by the Government: For example, a fortnight or so ago the drill passed through the solid metamorphic granite into a soft sandy substance, containing, it is believed, traces of oily matter. Secondly, the gas which has always been present in small quantities in the borehole, has latterly increased in volume during drilling, and the colour of the flame has become more pronouncedly yellow. But beyond these and the evidence of a slight but distinctly oily film upon the water flowing into the sump, there is no material upon which an inexperienced observer can venture to pass judgment. The value of the indications must, therefore, be left to the Government expert to assess, and upon his verdict the fate of the Boom that is preparing among an expectant countryside will depend.

Why They Believe.

Certain reasons, however, may be advanced in justification of the faith which has inspired the small band of men in the North-West (Cape Colony) Prospecting Syndicate throughout the long and frequently discouraging time during which they have pegged away at the Dubbelde Vlei proposition. The first is that an eminent mining expert of international repute, after spending some weeks in the Carnarvon district several years ago, reported most hopefully upon the prospects of finding oil in the area which is now generally known as the " Oil Belt." The recent " strike " of a " pocket " of soft substance in the metamorphic granite

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naturally gave rise to a belief that the predictions of this expert were about to be fulfilled. Unfortunately, the drill has once more entered solid rock.

The second reason is one which must be apparent to everyone who knows this vast stretch of salt-vlei country to the north-west of Carnarvon. Perhaps we were unfortunate on the occasion of our journey to Dubblede Vlei a few days ago. The Karoo was certainly in her most repellant mood. All the glories of her purple distances, the clear radiance of her sun-kissed smiles that are wont to charm and hold the returning wanderer, were blotted out in a scurry of blinding sleet, driven full pelt by a shrewd and uncharitable wind. This gave an added touch of desolation to the scene. Rheumy eyes searched the landscape vainly for signs of human habitation. Mile after mile of sandy waste and muddied depression tore by with a chilling blankness. The voyage had for a while the air of an Arctic expedition, and the objective of the Dubblede Vlei borehole the remoteness of the North Pole. But though physical discomfort may have discoloured the outlook on this occasion, it must be impossible at the best of times for anyone to look upon this far-ranging emptiness, which yields little or nothing for either human comfort or sustenance, without feeling a tremendous curiousness about it all. The Almighty must surely have intended it to serve some good purpose, and since it obviously cannot produce food, and prospectors have declared it innocent of gold or diamonds, it must surely be meant to yield petroleum. Some such reasoning as this is at the back of most men's minds when they look across the great flats of the North-West and ask themselves the eternal question: "Why?"

Micawbers in the Union.

A third reason is that South Africa is a country where something always "turns up" when it is badly wanted, and the case of those who "reason" so runs something like this: The Rand is nearing the end of its wealth; diamond production has been closed down for a while till the market recovers; things generally are "slumping." It is about time something else "turned up" to restore the balance, and why not petroleum. The big nations are scouring the earth to find new oilfields. America is getting anxious about the future of her own supplies. Many wells are approaching exhaustion; some wells in Mexico have already shut down. South Africa is one of the few countries where no petroleum has yet been found. It is supposed by experts that very little exists here. But who are "experts?" Did not "experts" at one time damn all prospects of finding payable gold on the Rand? Did not they also try to drown with discouragement all hopes of discovering diamond pipes in the country? Why, then, should they be any nearer the mark in their predictions about oil?

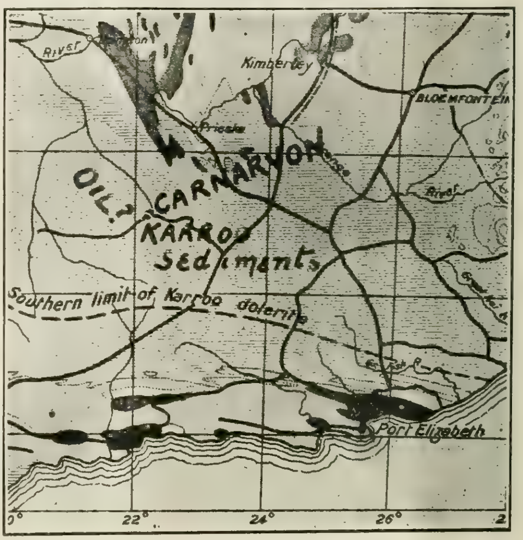
So the battle of words goes on. But the last word so far seems to rest with Mr. Cunningham Craig, the expert who reported on oil prospects in the Union in 1913, whose conclusions must stand until they are definitely upset by a greater refutation than Dubblede Vlei has yet produced.

Mr. Craig unfortunately appears to have left behind with those who met him in the North-West territory the impression of a most Superior Person. His report, too, wears in many places an air of cocksureness that is naturally irritating to people who know from long experience that we can be sure of nothing in South Africa—not even the solid facts of geology. None the less, the natural features of the Karoo upon which Mr. Craig based his case remain unaltered, no matter what may happen to the interpretation which he placed upon them. "There is," says this expert, "no geological structure in the neighbourhood (Dubbelde Vlei) which could possibly concentrate petroleum towards the locality." Because of this, he declares that "from the very first there was no hope of striking oil."

4,610 Feet Down.

When Mr. Craig visited the Carnarvon district the Dubbelde Vlei bore had reached a depth of 3,614 feet, by which time, according to his report, "any problematical chance of finding oil in the Karoo rocks was at an end." Since then the bore has been carried a further thousand feet through the gneissose granite. The question which now remains to be answered is whether anything which has been disclosed between 3,614 feet and 4,610 feet is sufficient to justify the hope generally entertained in the district that oil will soon be struck. The report of Dr. Wagner, the Government Geologist, upon this point is therefore awaited with intense interest. Will it, or will it not, mean oil?

South Africa badly needs oil. The opening up of a rich oilfield anywhere in her territory would be a tremendous thing for the country. It would far transcend in importance the discovery of the gold and diamond fields. It would inaugurate a wonderful era of real industrial prosperity. These facts have been constantly present in the minds of the little party of men who have visited Dubbelde Vlei this week and have given a tinge of optimism to their outlook which not even the frigid memory of two hundred Arctic miles crossed in motor-cars can quite obliterate. They are mentioned here to show that there is a general desire to believe in the possibility of a strike of oil in the North-West. And let one other explanatory fact be added: If anybody "strikes ile" in South Africa nobody better deserves to do so than the little group of earnest, progressive public men who have been financing the Dubbelde Vlei proposition out of their private pockets for many years past. They have put up a magnificent fight against the heartbreaking geology of the Karoo, and everybody wishes them good luck.



The Carnarvon "Oil" Field.

But, when all this is said, it is by no means certain as yet that they are winning, and until the official report on Dr. Wagner's recent investigation is published it is desirable that the natural optimism of the good people of the Karoo should be held tightly on the leash of a more restrained expectancy.

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The Oil Shale Industry.

AN EXAMPLE FROM CANADA.

Mr. Alexander Gray writes to the London papers to the effect that a plant to treat 5,000 tons a day is talked of as a result of the work of the Anglo-Persian Oil Company's technical staff on the oil shale deposits of New Brunswick, Canada. The quantities easily accessible far exceed the requirements of such a plant, and private advices testify to the satisfaction of the experts with the treatment process which has been under demonstration.

Mr. Gray continues: Anglo-Persian Oil Co. operations on the New Brunswick shales have proceeded far enough to justify the seemingly semi-official announcement of Mr. J. A. L. Henderson, of London, that a plant to treat 5,000 tons daily at a cost of $12,000,000 is among the possibilities in about two years. As Mr. Henderson also is quoted as having stated a per ton recovery of 35 gallons of crude oil and 70 lb. of sulphate of ammonia has been obtained from what shale has been treated in the 8-ton testing plant since it started not quite two months ago, it is being taken for granted that the Anglo-Persian technical staff will recommend the provision of a plant employing the Wallace process of distillation, or another process of equal or greater efficiency. More engineers arrived in New Brunswick from Scotland a week or two ago. They are determining the relative efficiency of processes. The initial try-out of the small plant, and the fact that the test has been made of what properly could be regarded as a bulk sample of the average of outcroppings, lends substance to the expectation that in due course New Brunswick after all may lead off with the first oil shale industry of magnitude on this Continent.

Apart from the corroboration supplied by Mr. Henderson, private advices attest the satisfaction of the technical representatives of the Anglo-Persian Co. and of Mr. Wallace, who is personally supervising the practical demonstration of his process. Quantitative and qualitative analyses to determine the gasoline, kerosene, and lubricating elements are alleged to have been reassuring—and yet those in charge are chary about official formal announcements. Hence the presence of Mr. Somerville, the Scottish expert. No doubt they realise what capital outlay and economies have to be established in a plant capable of dealing with 5,000 tons daily, and giving a daily production of 150,000 gallons of crude and 300,000 or 350,000 lb. of sulphate of ammonia, along with paraffin wax, etc.

So far they have displayed no misgivings, either as to the contents or the efficiency of the Wallace process, and a series of retorts on order bespeaks their further purposes. Some 17,000 ft. of drilling, to a depth of 3,000 ft. in some instances, without penetrating through the shales insures tonnage beyond the requirements of the plant talked of, and for more years than enter into present estimates. In one section, when the shale proposition was entertained by Imperial interests and Sir Boverton Redwood was authorised to examine it, it was claimed there were 145,000,000 to 150,000,000 tons "easily accessible." Since then further drilling has revised upward that aggregate. Consequently the prices at which the respective products can be marketed in quantities will become the governing factor.

Scottish precedents cannot altogether be relied on. The area held by the Anglo-Persian is said to contain an infinitely greater tonnage than Scotland possessed and the shales are richer. Whether the average contents represent a realisable $4 or $5 per ton of shale, the undertaking has assumed prime importance because of Imperial sponsorship and the amount of money involved. The proximity of the shales to tidewater and rail transportation is a distinct advantage not enjoyed by any other shale occurrence on this Continent. When the cost of mining, distilling, and refining the several products is beyond conjecture continuous performances of the plant are expected to hasten the utilisation of similar deposits elsewhere.

To have shales with a potential value of a billion or two billion dollars is something to go on with, even though oil operators and economists in oil have doubted whether such deposits are profitably possible or seasonable until the natural, more spectacular oil fields are nearer to exhaustion. Regardless of results obtained in Scotland, not until now has any of the great oil corporations affirmatively considered shales.

Langlaagte Strike: Investigation Committee's Findings.

The Committee of Inquiry appointed by the S.A. Mine Workers' Union to investigate the spreading of the Langlaagte Strike on February 7th, and to deal with those responsible, issued its report last week-end.

The Committee has punished by fine or suspension from office 21 officials and members of the Union, and reprimanded six, in addition to suspending the whole of the Springs Executive for 12 months. The total fines amount to £505, the individuals dealt with being as follows: G. de Meillon, reprimanded; E. S. Hendrickz, fine £60; E. Shaw, fine £50, period of suspension 3 years; P. Fisher, fine £50, suspension 3 years; D. Taylor, fine £50, suspension 3 years; J. L. Mare, fine £50, suspension 3 years; D. McPhail, suspension 4 years; J. Wordingham, suspension 5 years; J. Shreeve, fine £40, suspension 3 years; M. Ryan, suspension 5 years; McDermid, fine £15, suspension 2 years; H. Spendiff, suspension 12 months; Sacks, fine £15; Van Coller, fine £15; W. Richardson, fine £15; T. King, fine £15; J. McNaughton, fine £15; C. A. Coetzee, fine £15; R. Annetts, fine £15; J. C. Lewis, reprimanded; H. Vos, reprimanded; F. Mason, reprimanded; W. Robertson, reprimanded; L. P. Sheridan, reprimanded; F. W. Pate, fine £40; M. Higgins, fine £40, suspension 3 years; A. J. Flynn, fine £20; Springs Executive, suspended for 12 months.

The Committee took the view that the instructions given by the General Council to Mr. P. Fisher and the delegates appointed in connection with the Langlaagte strike—Messrs. Mare, Taylor, and McPhail—were wilfully misconstrued to suit the ends of the delegates, who had the extension of the strike in their minds.

The action of the president, Mr. W. S. Lewis, is commented on in the report as having been "thoroughly constitutional and for the welfare of the Union." The Committee deprecates Mr. De Meillon's lack of decision in not voting at the executive meeting on February 7th—this being the ground of the reprimand—while amazement is expressed that Mr. E. S. Hendrickz allowed his power to be taken away from him on the assertion of a temporary organiser.

The strike statistics in the report give the following interesting figures of the losses due to the extension of the strike: Approximate loss in wages, £42,290. Approximate number of men who lost leave privileges, 3,174. Number of strikers not immediately re-employed, 18. Cost of Commission, meetings, deputations, etc., £4,419.

All the punishments date from last Saturday.

MINES DEPT. EXAMS., 1920—1921.
CERTIFICATES AWARDED INSTITUTE.

SURVEYOR'S CERTIFICATES—March, July and October (Extra) Exams., 1920. 100 per cent., 50 per cent., and 66 per cent. respectively of S.A. total.
MANAGER'S CERTIFICATES.—Two Exams (Sept., 1920, Jan., 1921), 17 out of total 28 in S.A.; 12 Certificates, (including coal), May, 1921.
OVERSEER'S CERTIFICATES.—Two-thirds of the S.A. total for year 1920, and also for the first six months of 1921. No metal failures during 1921.
COAL CERTIFICATES.—Ten Certificates (1921) obtained.

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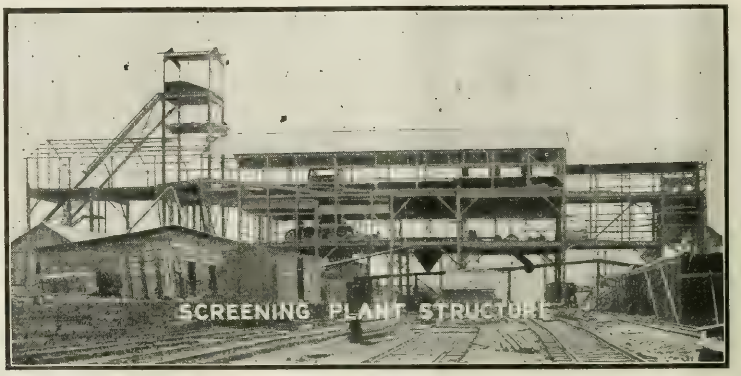

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EDITORIAL.

RECENT NEW ISSUES.

Although the rumour that General Smuts has been successful in arranging the preliminaries of a loan of £15,000,000 in London remains unconfirmed, there is good ground for believing that the Prime Minister's efforts in that direction will be crowned with success. It is plain at any rate, that if the country is to get the money now urgently required for development purposes it will as usual have to look to London for the bulk of it. Recent attempts to raise capital in South Africa for public or private purposes have been singularly unsuccessful, and though the bank returns still show deposits of many globular millions lying in comparative idleness at from three to four and a half per cent., there seems to be no disposition to transfer any considerable portion of these millions to more enterprising and remunerative forms of investment. We need hardly remind readers of the number of mining flotations that have been but partly successful during the past year. The fate of several recent appeals to the public will readily be remembered by those interested in such things. More important and significant, however, is the lack of response to several recent issues of a public nature. The Central Reserve Bank, for instance, obtained subscriptions for little more than a quarter of the issue offered. The new 6 per cent. Union Loan issued in South Africa has evoked a very meagre response, and the various municipal issues, such as those of Durban and Kimberley, are understood to have proved disappointing. Even the attractive terms offered by the Rand Water Board last year did not tempt investors as it should. The following details of the loan, taken from the latest report issued by the Board, provide a typical history of recent loans in South Africa.

In June, 1920, simultaneously with the adoption of the scheme for obtaining a supply of 5 million gallons a day from the Vaal River, the Board decided, as far as possible, to raise in South Africa the capital moneys required to meet the cost of that scheme, and, as a first instalment, authorised a local issue of Rand Water Board Stock under the borrowing powers conferred by Act No. 18 of 1914. This decision was arrived at after the most careful consideration of the terms on which the necessary capital could then be raised in South Africa and London, respectively, and it was concluded that the conditions in South Atrica were more favourable to the Board. Accordingly, on the 1st July, 1920, the Board offered for public subscription in South Africa, £1,282,000 Rand Water Board 6 per cent. Stock, redeemable at *par* on the 30th June, 1950, the issue price being fixed at £97 10s. 0d. per £100 Stock. On this basis, the proceeds of this issue, if fully subscribed, would have amounted to £1,250,000 cash, the sum which the Board was authorised to raise under the Act referred to above. Although the immediate response to this issue of Stock, particularly from small investors throughout the Union, was quite satisfactory, the financial stringency which prevailed throughout the country shortly after the subscription lists for the Board's Stock were opened militated against the possibility of the loan being fully subscribed. As a fact, Stock to the nominal value of £611,250 had been subscribed for as at the 31st March.

Indeed, all things considered, the Water Board did not do so badly, and it is fortunately in a position to be independent of the moneys derived from the issue. The financing of the new scheme can be completed out of the Board's reserves. These facts are quoted to show that we must still look to London and the good offices of the Prime Minister for the millions required to carry on the necessary development work of the Union. In view of the distinguished services which General Smuts is now rendering to the Empire, it goes without saying that his efforts on behalf of his own country (which we hope he will make) will have the cordial support of His Majesty's Government in London.

THE PRICE OF TIN.

Elsewhere in this issue the prospects of the base metal mines of the Union, as affected by the world demand for their products, are dealt with. Of all our base metals, tin is, of course, the chief in point of output and number of producers, and the extraordinary fluctuations in its price during the past eighteen months are of vital interest to this country. The drastic nature of the drop in all base metal quotations during 1920, is, of course, now economic history. The variation was most pronounced in the case of spelter, quotations ranging from a maximum price of £62½ to a minimum of £22½. For lead the apex was reached at £52⅜, whilst the lowest quotation was £21½. Tin reached the high-water mark of £419½, only to recede to the low level of £195, whilst the price of copper oscillated beween £70 and £122¼. In so far as tin was concerned the opening quarter of 1921 brought no relief. On the contrary, it falsified the expectations of many, the price dropping to levels not recorded since 1915. Early in January Straits tin still commanded over £225 a ton, whilst English tin was quoted around £206. Thenceforward the price dropped steadily, and before the middle of March English tin was quoted as low as £149½ for cash, with Straits tin at £163. Dealers on all sides complained of the dearth of trade demands. At home the industrial depression stifled the demands of the tinplate industry, many of the works, particularly in South Wales, struggling along on short time. The improvement in the New York exchange, so advantageous a factor from the point of view of purchases in that country, was responsible for reducing the American demand for tin to a low ebb. According to the Board of Trade returns, exports of tin to the United States fell in quantity from 1,595 tons in the first quarter of 1920 to 235 tons in the first quarter of 1921, and in value from £568,070 to £40,263. The total export of tin fell from 4,001 tons, valued at £1,364,786, to 2,674 tons, valued at £505,594. The fall in prices, it will be remembered, resulted in the gradual closing down of the Cornish mines and the accumulation of big tin reserves by the British Government, which tried, unsuccessfully, to help the Straits producers by fixing for a time a minimum price for the metal. Latest advices from London are to the effect that a much better feeling is now apparent in the tin market. This optimism is reflected in the firmer tone and in the improvement in the price. According to the Board of Trade, the imports of tin into the United Kingdom during the five months ended May 31, 1921, only amounted to 6,341 tons, or exactly 50 per cent. of the quantity received in the corresponding period of 1920. The fall in the price is excellently reflected in the drop in value from £4,556,887 in 1920 to £1,169,306 in 1921. Exports of tin for the same period have fallen from 6,139 tons, valued at £2,127,086, to 4,736 tons, valued at £841,436. Messrs. Ricard and Freiwald report that the total visible supply of tin amounted to 17,528 tons on May 31, 1921, as compared with 18,439 tons on December 31, 1920. This comparatively slight decline shows that, despite the reduction in the output of tin—the arrivals of Bolivian tin ore in Europe in the first five months of 1921 are said to be less than half of those for the corresponding period of 1920—the trade demand is still restricted. With the resumption of the tinplate industry, and the anticipated increase in the demand from Germany and the Continent generally, there is reason to hope for further good news of the industry in the near future.

Notes & News.

Magadi Progress.

There has always been a good deal of interest evinced in South Africa in the working of the Magadi soda deposit, and the latest particulars are contained in the annual report of the Central Mining and Investment Corporation. It is there stated that the production of soda ash was commenced last November, the output is increasing, and shipments are taking place under contracts. Owing to its position and the favourable shipping facilities, the outlook is regarded as satisfactory for profitable business over a wide area in eastern markets. Caustic soda of good quality is being produced and sold in India.

* * * *

The Position at the Rhodesian Broken Hill.

A very satisfactory account of progress at Rhodesian Broken Hill is given in the annual report of the Central Mining Corporation, and it shows that during the past year the production of lead has been about 1,200 tons monthly, the highest output being 1,446 tons in August. The output has since increased and reached 1,812 tons for April of this year. The extensions to the smelting plant are being completed. Experiments are being conducted with a view to developing the profitable recovery of the vanadium contents of the ore. Experiments are also being prosecuted for the utilisation of the zinc deposits on the property.

Central Mining Enginering Practice.

There is an interesting reference in the annual report of Mr. Hugh F. Marriott, consulting engineer to the Central Mining Corporation, to the features of engineering practice on the mines of the group during last year. Mr. Marriott points out that an outstanding fact of the year was the use of second-hand plant for extension of power requirements and equipment for mining and development operations, and in one case also for a complete plant both underground and on the surface. This policy has been rendered necessary by the difficulty of obtaining new materials from Great Britain, due to delays in securing reasonable delivery of orders on account of the congestion of work or the disorganisation caused by strikes. He adds that the equipment which has been assembled from second-hand material has proved generally successful, and has resulted in a material saving of cost to the mines concerned. The standardisation of high lift centrifugal pumps for keeping the mines free of water has progressed, and underground water is being satisfactorily dealt with. The control of the supply of compressed air in the mine is receiving attention, and meters of special design are being installed with a view to effecting further economies. The standardisation of specifications for stores in regular demand has been introduced with good effect, and the systematic control of stores is being extended. Generally the industry is emerging from the stage where it had to be run on any material that was available, and a return is now being made to organised selection of the best and most economical materials for the purposes required. These excellent results have been achieved and can be maintained only by a centralised organisation under which carefully thought-out policies for greater efficiency and economy can be put into effect.

* * * *

Mining in the Northern Transvaal.

Speaking at the annual meeting of the Pietersburg Chamber of Commerce and Mines last week, Mr. Percy Louw, the chairman, said, *inter alia*:—"I regret to state that mining in the district has had a very severe setback during the past year. Owing to the severe drop in prices of products most of the tin and copper properties had to temporarily close down or strictly limit their operations. The recent threatened closing down of the Messina Mine, the principal mine in the Northern Transvaal, caused great perturbation, affecting as it would so many interests. Delegates from the Zoutpansberg Chamber and from our own at once proceeded to Capetown, and in a small way were able to assist in bringing about the compromise arrived at with the Government, and thereby enabling the mine to continue operations. Considerable activity has been evident on the asbestos field in the Malips area, and several new companies are developing with satisfactory results. Rich strikes of gold are reported from the Klein Letaba and Marabastad areas, and companies are being formed to develop these."

* * * *

Oil at Carnarvon?

Dr. Wagner has reported unfavourably on the boring for oil at Carnarvon. After his recent visit to the farm Dubbelde Vlei, Carnarvon district, he expresses regret that the report is unfavourable, as a more courageous and honest attempt to obtain oil by boring has surely never been made. Dr. Wagner's conclusions, briefly, are as follows: (a) The oily matter occurring in the sludge pumped out of the borehole as in thin films on the surface of circulating water is not a natural product, but is derived from the mixture of anti-friction grease and tallow used for greasing the three lowest lengths of the rod; (b) what were taken to be layers of oil-bearing sand are fissures in gneiss granite filled with sandy, clayey gouge; (c) the gas evolved from the hole is probably a mixture of methane derived from carbonaceous white band shales of the dwyka series and gas derived from the cracking of mixture of grease and tallow by heat generated by the boring at this great depth; (d) there is no prospect of striking oil in commercial quantities in the area under review, and further boring is unjustifiable.

Coal Pulverising Plant at Bunker Hill Smelter, U.S.A.

Mr. T. A. Rickard, editor of the *Mining and Scientific Press*, in a recent article on the Bunker Hill smelter, described the coal-pulverising plant as follows: The coal-pulverising plant has the usual Bonnot equipment. The screw-conveyors under the storage-bins discharge on to a belt-conveyor running under an electric magnet and into a weighing-hopper. The coal is then fed into a 4 by 30 ft. dryer, which is fired direct, and from here the coal is conveyed by a screw-conveyor to two one-two storage-hoppers over two Bonnot pulverisers. The pulverisers have a capacity of 1½ tons per hour. The fine coal is sucked by a fan from the pulveriser into the main storage-bin, where it is settled by a Bonnot "collector." There is one distributing fan for the silver and lead refineries, and another for the D. and L. roasters. An air-float valve regulates the speed of the motor that drives the screw-conveyors from the main storage-bin into the distributing fans; it is arranged so that when more burners on the line are opened, more air is supplied there; consequently, this float-valve accelerates the screw-conveyors and increases the quantity of coal fed into the line, and, similarly, when coal-burners are turned off the quantity of air drawn is lessened and the speed of the screw-conveyors is decreased. Thus the mixture of air and coal is kept constant. The mixture in the distributing pipe is 50 cubic feet of air to one pound of coal, and an additional 150 cubic feet of air is supplied at the furnace by an auxiliary blower in order to make perfect combustion. About 85 per cent. of the pulverised coal will pass a 200-mesh screen.

* * * *

Newcastle Iron and Steel.

The works of the Newcastle Iron and Steel, Limited, are situated in the neighbourhood of the town of Newcastle, and have been the centre of considerable interest ever since their commencement. As shown in the first annual report, the progress of the company up to the 31st March can briefly be put down as follows:—A further 50 acres of ground have been acquired in addition to the 150 acres originally held by the Company.

At the works, construction has proceeded at a satisfactory rate. Although delays were experienced with regard to obtaining certain refractory bricks for lining the furnace and stores, it is hoped that smelting operations will commence early in October next. The size of the furnace has been increased by 5 feet and the stoves by 15 feet. The capacity of the plant should be about 150 tons per day when the 4 stoves are going; but at the commencement only two stoves will be used, giving a capacity of 70 to 80 tons per day, gradually increasing to 120 tons per day in about three months' time. A noteworthy feature of this undertaking is the comparatively small amount of capital (£124,736) which has been required to bring the works practically to the producing stage. This is accounted for by the fact that advantage was taken of the existence of certain unused plant and supplies in this country which could readily be adapted to the needs of an iron reduction plant. This is an important step and goes to show how local conditions can be taken advantage of in entirely new ventures.

* * * *

The Future of Rhodesia.

The following is a fuller version of the statement on the future of Rhodesia made by Major Wood (Under-Secretary for the Colonies) in the House of Commons a few days ago during a debate on the Colonial Office vote. Referring to the Chartered Company's administration, Major Wood said he hoped no party would forget all that had been done by the Chartered Company and the shareholders in the development of Rhodesia, and through it of Africa and the Empire. Regardless of dividends and the feelings of the shareholders, the Chartered Company with great patriotism had set themselves to continue the work initiated by the South African statesman after whom the country had been named. He had heard doubt expressed as to whether the financial position of Rhodesia was sufficiently strong to warrant the grant of responsible government. He did not propose to discuss that question in detail, but he had been at pains to look into the question of the financial position during the past few years, and he could find no grounds for pessimistic doubt that Rhodesia was not sufficiently strong to warrant the granting of responsible government. Major Wood added: "I should think it very unwise to force or prejudice the conclusions of the people of Rhodesia in advance of their freely expressed opinions." After replying to an interjection by Earl Winterton, Major Wood expressed the opinion that those persons were wrong who said that the report of Lord Buxton's committee in any way prejudged or prejudiced the question of possible eventual entry of Rhodesia into the Union of South Africa. That question, declared Major Wood, ought to be entirely for Rhodesians themselves to answer.

* * * *

Northern Rhodesia Minerals.

Writing in the *Chemical Engineering and Mining Review* on the subject of South African mining, Mr. E. M. Weston, A.S.M.B., remarks, *inter alia*: Copper has been produced at the mines of the Kafue Copper Company, some 200 miles west of Broken Hill, and the Kafue River has been used for transport. About 6,805 tons of smelted copper have been produced. The ore bodies seem irregular; but rich bodies of oxidised ores and bornite in dolomite.

The Bwana M'Kubwa (native name for "big master") mine lies north of Broken Hill, and is distant 1,476 miles by rail from Beira. The outcrop forms a prominent kopje or hill about half a mile long and 100 ft. high, showing malachite stains along the east side. The ore occurs impregnating a felspathic quartzite. Water level lies at a depth of about 200 ft., and the ore body above it is wholly or partially oxidised to carbonate and silicate. The sulphide ores are bornite and chalcopyrite. Some rich concentrations, averaging 12 per cent., were mined and roughly concentrated to 40 per cent. copper, producing about 5,232 tons of concentrates, which were exported. There is developed about three million tons of 4½ per cent. ore, which is suitable for treatment by flotation with an 85 per cent. to 90 per cent. recovery. These concentrates will probably be smelted at Wankies.

Nearer the Congo border and 30 miles to the west of Bwana M'Kubwa, just over the Kafue River, a much larger series of ore bodies is being opened up at N'Kana. Their extent and the exact nature of the deposits are not yet fully determined. Some are apparently fissure lodes, others occur in similar felspathic sandstones or quartzites to Bwana M'Kubwa, from which they are separated by a granite intrusion. They occur in the Nzilo series of beds, and ore bodies occur impregnating slates, conglomerates, quartz schists, sericite and mica schists.

The mica schists show some remarkable features. The lodes have been sunk upon to a depth of 115 ft., or 60 ft. below water level. Above water level the chief ores are malachite, silicate and black oxide of copper, with considerable black oxides of manganese and iron, derived apparently from a manganese iron variety of mica. Above water level bornite occurs, and development below water level shows that it will be the main copper ore in the sulphide zone. The main lode has been proved for 5,300 ft. Its width has not been fully determined, but is probably from 20 to 100 ft. The value of the ore is from 3 to 6 per cent. copper.

The richest ore body is in another lode and appears to be from 50 to 80 feet wide. It has been proved for a length of about 1,800 ft. The value seems to be from 7 per cent. to 11 per cent. copper; but leaching is strongly in evidence, even at a depth of 115 ft. Work to date seems to indicate that these ore bodies may be expected to yield about three million tons per 100 ft. in vertical depth; but their full extent is nowhere apparent.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining.

Storage of Compressed Air below Ground.—The Colliery Guardian, June 24, p. 1804.

Safety in American Mines.—The Iron and Coal Trades Review, June 24, p. 847.

Coal.

Fineness and Dryness of Pulverised Coal as Fuel.—The Engineer, June 24, p. 668.

The MacLaurin Carbonisation Process.—The Iron and Coal Trades Review, June 24, p. 849.

The Analysis of Coal.—The Colliery Guardian, June 24, p. 1803.

Iron and Steel.

Modern Steel Works Power Plants.—The Iron and Coal Trades Review, June 24, p. 853.

Engineering.

The Relationship between Efficiency and Working Costs of Small Motors and Generators.—The Electrical Review, June 24, p. 827.

Aluminium and Its Alloys in Engineering.—The Engineer, June 24, p. 659.

Economics.

American Mining Costs.—The Colliery Guardian, June 24, p. 1816.

Trade Unions and Profit Sharing Agreements.—The Electrical Review, June 24, p. 806.

The Royal Dutch-Shell Millions.—Money Market Review and Investors' Chronicle, June 25, p. 733.

THE METAL MARKET.

Cables dated London last Saturday state:—Metals have been quiet during the past week, and the hopes of improvement on the settlement of labour troubles did not materialise. Copper was dull. The cautious attitude of the operators was due to the situation as regards the American exchange, while the forecast of a large increase in the output of the Union Miniere was not a bull point. The East is sending small orders for manufactured copper. Tin prices declined owing to the lack of trade demand. The offerings, however, were well absorbed. The East sold more sparingly, and China made no offers at all, while the fall of sterling exchange discouraged American inquiry. Any substantial improvement in prices is not expected at present. Lead was very bright, especially for spot transactions, in which there was active business in which customers participated. There is no indication of excessive supplies coming to the market. Spelter was very quiet. Realisations by tired holders are expected unless consumers afford assistance. Silver closed 37¾d. The upward tendency during the week was due to India and China buying rather persistently. All gold arrivals were taken for shipment to New York.

Cables dated London, Monday, are to the effect that there are numerous signs of a revival in industry. Several mills and tinplate works in South Wales are restarting, which means the employment of a large number of workmen. There is a keen demand for textile machinery from Lancashire, especially from India, and also from France and Japan. During the first six months of 1921 79,282 tons of textile machinery were exported from the United Kingdom, compared with 88,082 tons during the first six months of 1913.

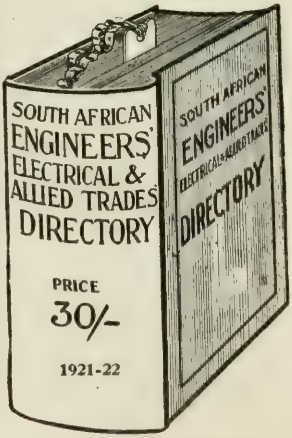
The next monthly meeting of members of the Geological Society of South Africa will be held in the Reading Room, 1st Floor, Scientific and Technical Club, 100, Fox Street (between Rissik and Loveday Streets), Johannesburg, on Monday, 25th July, 1921, at 8.15 p.m. Business:—The minutes of the ordinary monthly meeting of members held on 27th June, 1921, will be read; election of new members. The following papers will be open for discussion:—"The Nature of the Tin Deposits near Kuils River, Stellenbosch District, and their relation to Other Occurrences in the Neighbourhood," by A. V. Krige, M.Sc.; "On Some Mineral Occurrences in the Namib Desert," by P. A. Wagner, D.Eng., B.Sc.; "On the Occurrence of Oil in Madrid," No. 281, in the Bethlehem District of the Orange Free State,' by A. L. Hall, M.A., F.G.S.; "Note on Some Fossils from the Vaal River Gravels," by S. H. Haughton, B.A., F.G.S.; "The Geology of the Neighbourhood of Heidelberg," by A. W. Rogers, Sc.D., F.R.S. The following paper will be read:—"The Nepheline Rocks of Sekukuniland," by S. J. Shand, D.Sc., Ph.D.

Wages on Mines.

The reply of the Chamber of Mines to the memorandum of the Joint Executives of the trade unions on the proposed reduction of wages has been handed to the workers' representatives.

This shows that the Chamber has decided to put into force the reduction of 1s. 6d. a shift as from August 1, a sliding scale, based on the cost of living, being proposed for future adjustments.

The proposal that wages on the mines should be reduced was first brought forward by the Chamber on June 1, when a claim for a reduction of 3s. a shift, based on the falling cost of living and the position of the industry, was advanced. This was contested by the workers, with the result that the Chamber later suggested that the reduction should be 1s. 6d. a shift. To this the unions responded with a counter-proposal that half the last flat-rate increase of £2 8s. a week should be consolidated, and that in regard to the other half—which should be considered equal to an increase of 57 per cent. in living costs—the workers should agree to a reduction of 6d. per shift for each 7½ per cent. by which the cost of living fell.



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Ventilation on the Mines of the Rand.

IMPORTANT INVESTIGATION BY JOINT COMMITTEE—GUESTION OF EXPENSE—LESSONS FROM AMERICA.

It may not be generally known that an important Joint Committee of the Mines Department and of the Chamber of Mines Technical Staff is now sitting in regard to the question of ventilation on the mines of the Rand. The Mines Department holds that the mines are not sufficiently well ventilated, and its representatives are engaged in demonstrating to the various mines how ventilation may be made more efficient. The subject has been given considerable prominence in our columns of late, and the local scientific societies have been engaged in debating it at great length. In a paper read recently before the Chemical, Metallurgical and Mining Society Mr. C. J. Gray, the Inspector of Mines for the Johannesburg district, said the reason for the apparent apathy on the part of South African mineowners is generally monetary. The purchase and maintenance of fans involves considerable expense. For many years, on the Rand, spraying was optional; even now fan ventilation is optional, and the distribution of air is haphazard. A manager who tried to better conditions underground would find his costs increasing; head offices would naturally compare the expenses with those on mines where no such work was being done. The desire for improvement would thus be stifled at its source; apparently legislation is necessary. Lack of ventilation, according to Mr. Gray, is at the root of the trouble; it is largely responsible for the conditions of ill-health among underground workers. The adoption of such improvements as sprays and atomizers, wrote another observer in 1906, merely indicates that the evil is being played with. Water is only a palliative; ventilation is the cure by which a clean bill of health can be secured. The preliminary report of an investigation that was made on the subject of miners' consumption in the mines of Butte, Montana, recently issued by the Bureau of Mines, says that "in most of the working places examined in Butte the temperature was well above 70 degrees Fahr., little or no movement of the air was perceptible, and the humidity approached saturation. Comparatively little work in such places causes body temperature quickly to mount from 98 degrees Fah. (normal) to 103 degrees or higher—that is, to fever temperature. The immediate effect of such conditions is greatly to decrease the working ability of the men. It is the impression of the authors of this report that in the places visited the time spent in actual work during an eight-hour shift was not in excess of four to five hours, and was probably much less. An adequate movement of the air, even if it did not lower the temperature, would greatly increase the efficiency of the men." The two signatories to the report make a number of suggestions, particularly as to how effective ventilation can be secured; they recommend a more extended use of doors, of fireproof canvas and brattice, and of regulators; on haulage roads a type of door should be used that can be relied upon to close automatically and that will allow a minimum leakage of air; all mines should be ventilated by means of fans.

Between the time of the investigation by the Bureau of Mines officials and the issuance of the report, Mr. A. S. Richardson, the ventilation engineer for the Anaconda Copper Mining Company, published an account, in the "Anode," of ventilation in the mines at Butte; he detailed the factors that control or influence the conditions that have prevailed in the past and will prevail in the future; and he outlined the steps that are being taken by the company to ensure, as far as is possible, the satisfactory ventilation of, and the reduction of temperature in, the underground workings. From this account we learn that in the Butte mines the rock temperature may be as high as 104 degrees Fahr.; the heat underground is also partly due to the "oxidation" of the mine timber, which is used in large quantity. The problem has been considered in all its details. It was found that resistance in the shafts, due to the open framing of timbers, retarded the flow of the air. The shafts have been lined with cement slabs and the faces of the timbers have been covered. The volume of air circulating per man amounts to more than 400 cubic feet per minute; 600 cubic feet per man per minute will be obtained when all the equipment proposed is in operation. It is pointed out that the laws governing the ventilation of both the bituminous and anthracite coalfields of Pennsylvania call for the circulation of 200 cubic feet of air per minute. Difficulty has been experienced at Butte in maintaining airtight the ventilation doors and bulkheads. Lower-level ventilation is to be ensured by "booster" fans, 200 of which will be used in the company's mines when they are all in operation. In short, it seems that the Anaconda Company is taking steps to remedy the conditions mentioned in the Bureau of Mines' report; it has always been the policy of the company to take such action; it is "good business" to better conditions that are unsatisfactory.

THE COPPER OUTLOOK—AN OPTIMISTIC VIEW.

That the crisis in the copper situation has passed and that the question now confronting the mining companies is the rapidity with which economic conditions will return to normal was the statement made by Mr. P. G. Beckett, general manager for the Phelps Dodge Corporation, recently. "We are also completing construction on a new concentrator and giving employment to several hundred men at the mines by doing certain development work. While it is difficult to appear in the role of a prophet at this time, I believe it safe to say that as conditions in this country and in Europe become better readjusted a gradual improvement will develop in the copper industry in this country. And while it is impossible to say just now how long a time will elapse before the Phelps Dodge properties are justified in resuming production, the fact that practically all large copper producers of this country have completely suspended copper production will hasten the time. It is now generally recognised that with the overwhelming surplus of copper there was on hand in the spring of this year, the quickest way to a resumption of healthy conditions in the mining industry in Arizona was a complete stoppage of copper production until a great part of the surplus could be absorbed. It may be said that the worst is over, and it is now a question of how quickly economic conditions here and abroad return to normal."

The Declaration of Peace.

In our last issue reference was made to the fact that in London they anticipated that the official date of "the declaration of peace" would not be until next month. From a question put by Sir F. Banbury in the House of Commons in mail week it would seem that not until Turkey formally ratifies the peace treaty can the official final declaration of peace be made. That was the explanation given by Mr. Lloyd George, and *Punch* comments on it that Turkey had better hurry up or there will be no Turks left to ratify the treaty.

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WRIGHT'S ROPES

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Underground Haulage for Mines of Moderate Size.

A FEW ECONOMIC CONSIDERATIONS.

The problem of underground haulage is one of growing importance on mines where materials have to be transported over long distances between shaft and workings. This matter is not so much felt on the Central and West Rand, where horizontal distances traversed are short, as it is on the Far East with its more or less flat-lying reefs. On the Central and West Rand the problem is one of elevation of materials from one part to the other more than one of lateral displacement.

The larger the areas undermined become on the Far East mines the greater will become the need for increased haulage efficiency and reduction of underground haulage expenses. Just as in the Central and West Rand, the haulage along vertical and inclined shafts has become a proposition requiring careful consideration, just so the underground haulage of the Far East mines is developing into a not inconsiderable proposition.

Several mechanical systems of underground haulage are in use all over the world. Briefly they are as follows: The endless wire rope system, gasoline locomotive, compressed air locomotive, and electric haulage with two methods of power supply, namely, the trolley system and the storage battery system.

Each system has its advantages and the choice of any one will depend entirely upon the local conditions under which that system must operate. The ideal aimed at is a system which will give a maximum of satisfaction for a minimum of expenditure. It must also be such that it will lend itself readily to the change of conditions likely to be experienced underground during the life of the mine.

The principal factors which enter into the working costs of a haulage system of this nature are the following:—

Reliability.
Operating labour expense.
Maintenance expense.
First cost of installation.
Safety.
Flexibility.
Personal preference.
Power consumption.

Upon the reliability of the system depends the continuity of the service it will render. Any stoppages mean loss of money; ore piles up in the chutes, and the output of the mill may even be reduced.

That operating and maintenance expenses should be a minimum is self-evident as they so vitally affect the economy practised on the mine.

First cost of installation is a point worthy of a good deal of consideration. It should not be allowed to affect the other factors too seriously. A plant with low initial cost may not be able to stand up to the service required of it, and cause trouble when least expected. This is a case where "the economy of spending" should not be lost sight of. The increase of interest on the larger capital cost will be a very inconsiderable sum on the ton-mile working cost of the plant.

As far as safety is concerned, all systems of haulage involve a certain accident hazard, and the reduction of this hazard to a minimum should receive major consideration. Apart from the humanitarian aspect, accidents are costly and tend to reduce operating morale.

In certain mines, especially those of the lode type, working methods do not always proceed along the same lines year in and year out, but have to suit the varying character of the ore deposit. These variations are bound to affect the haulage employed, and it must be of such a character that it can be altered to suit the particular needs of the locality.

It is hardly necessary to point out to what extent power consumption enters into the economy of underground haulage, but it is an additive factor; hence the lower it is kept the higher will be the working profits of the mine.

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Mining and Commercial Possibilities of Tanganyika

OFFICIAL REVIEW OF THE NEW TERRITORY—GOLD AND COAL DISCOVERIES—BUSINESS CONDITIONS.

We recently reviewed in these columns the new mining regulations of the Tanganyika Territory, formerly known as "German East Africa." It is three times as large as the British Isles, but has a population only three times that of Birmingham.

H.M. Commissioner in East Africa, Col. Franklin, C.B.E., D.S.O., has prepared a report on its resources, and this has been published by the Overseas Trade Department. The Germans, who had invested largely in this direction, were, by the middle of 1914, just beginning to reap the benefit of their efforts, for exports for the fiscal year 1913 were £1,777,552, against imports £2,667,925. The War stopped further trade, and when, after its close, trade was resumed, the new Tanganyika Government found that much of what the Germans had done had been wasted. The British Army, in its advance south, did its best to prevent further deterioration. The civil government appointed a Custodian of Enemy Property in March, 1917, and, in the following May, took over the whole of the northern area from the military authorities, subsequently extending its jurisdiction to the central and southern districts. It will be a long time before the estates the Germans left reach their pre-war level of upkeep. Most of the large business premises in such towns as Dar-es-Salaam and Tanga are vested in the hands of the Custodian of Enemy Property, and the first auction sale took place last month.

Chief Products.

In considering the industries and production of Tanganyika Territory, Col. Franklin first describes its natural resources, and states that the products are essentially tropical, or semi-tropical. As regards minerals, only mica and gold were exported in pre-war days. Mining operations were started in Usamburu and Ulunguru mountains. There is good reason to believe that coal, copper, lead, silver, mercury, graphite, asbestos, and lignite can be successfully exploited, and the country is eminently suited for cattle. There are electric power stations at Dar-es-Salaam and Tanga, with soap factories at the former place, and salt at Gottorp. The principal exports are sisal, cotton, hides, skins, grain, copra, coffee, and ground nuts. The Germans sank an immense amount of capital in rubber estates, and their plantations are to be seen all along the Central and Tanga lines, but only a heavy rise in the price of the material can make these estates profitable.

Gold.

The Germans had a great belief in the value of the Muanza district as a gold producer, and at the time of the war had pegged out 15,000 claims. But health conditions there are bad, and the persistency of the fly prevents animal transport. There is as yet no Mines Department proper, or staff, but a geologist has been appointed by the Colonial Office to report on the whole position. Coal has been discovered inland from New Lagenburg, but without transport no great developments can be expected. There are indications of coal deposits in Ruvi valley

Imports.

There will be a demand from Tanganyika Territory for gas and oil engines, electrical and mechanical appliances, locomotives and wagons for the railways, motor transport and mine milling machinery for the mineral and timber development of the country. A large proportion of the trade is done with Zanzibar. On all parts of the coast it is becoming increasingly necessary that United Kingdom manufacturers and exporters should take more trouble in making quotations, especially when trying to do business by catalogue through the mail. The difficulties of United Kingdom manufacturers owing to variable costs are appreciated, but it should not be difficult to arrange for catalogues to be accompanied by a leaflet giving prices at the date of despatch of the catalogue—of course, with all proper reservations. The best way to quote would appear to be "Delivered duty paid Coast Port" (Dar-es-Salaam or Tanga), for it is in this form that most American catalogues are priced. United Kingdom firms who have not this information readily available can obtain all particulars as to freight and landing charges, and, if necessary, the names of clearing agents from the Department of Overseas Trade, Old Queen Street, London, S.W.1.

Banks are established at Dar-es-Salaam, with branches at Tanga, Tabora, Muanza, and Bukoba, and there are also Chambers of Commerce at all these places. Railway development has proceeded apace. There are two chief lines—

The Great Volcanoes of Ruanda, near Lake Kivu, on the borders of the Congo, Uganda, and "German" East Africa.
(Ruanda, formerly included in Tanganyika Territory, has been ceded to Belgium.)

the Central and Usumbura. The former is 780 miles long and the latter 222 miles. The Central line (built for strategic purposes) links the Belgian Congo with the Indian Ocean—Lake Tanganyika being the keystone of Central African trade. The Usumbura line stretches from Tanga to New Moschi, through the richest and most developed part of Tanganyika Territory. There is a steamship service on Lake Tanganyika, but it is rather irregular. Dar-es-Salaam and Tanga are the starting points of the two railways. The former has a fine enclosed harbour, and there is a small floating dock and a well-fitted naval dockyard. Tanga has a good inlet harbour and anchorage. There are also subsidiary ports, fit only for coasting steamers. There are, of course, the big steamship lines which serve the coast of Tanganyika Territory, and, in addition, small coasting steamers plying between Lindi in the south of Tanganyika Territory, via coast ports and Zanzibar, to Lama in the Kenya Protectorate.

Labour and Population.

The European population of Tanganyika Territory is about 13,000, 950 being British, the remainder comprising Americans, with representatives of other European nations—Germany excepted. There are 8,000 Indians, 5,000 Arabs, and 3,000 of miscellaneous races. The population was estimated by the Germans in 1913 at 7,600,000, but it has been almost halved by the cession to the Belgian Congo of Ruandu and Urundi. The amount of labour is limited. Some of the natives are too young for work, and no doubt others will not work. The native leaves his wives to do the work while he sits at home to keep up the dignity of the family. Col. Franklin's opinion is that the development of the country will be largely dependent on the wisdom and efficiency of the medical and educational departments. He says: "The educated, but lazy, native is a menace; the contrast an asset to the country, deprived of 50 per cent. of its population by the transfer of two of its provinces."

Commercial firms established in Tanganyika Territory have done good pioneer work, but business, on the whole, has been disappointing. It is only right to say, however, that it has been carried on under quite exceptional disadvantages. The total revenue for 1919-20 was £669,087, the grant in aid from the Imperial Government being £330,000. The request for the current year is £1,500,000. Tanganyika Territory is not inviting for the small capitalist. Its development will have to be supported by large financial facilities.

Oil v. Coal.

Sir Edward Mackay Edgar contributes to the current number of *Sperling's Journal* an interesting article on "The Coming Eclipse of Coal," in which he foreshadows the displacement of coal—and especially British coal—from its eminent position in the national economy and the taking of its place by oil. Only science, he says, can avert this, and he is awaiting the considered verdict of science. On the rivalry between coal and oil he says:—"A decreasing output, a swollen labour force, and American competition are not the only obstacles in the way of the resurrection of the British coal industry. It has to face the competitive encroachments of a rival that can no longer be disregarded—oil. It is not merely the coal industry but coal itself, as a prime source of heat and power, that is threatened to-day. What has happened in Great Britain during the past two-and-a-half months has a significance which, in my judgment, will long outlast the emergency that provoked it—I mean, of course, the adopting by one industry after another, and by one utility after another, of oil instead of coal. In the middle of April the oil distributing companies in the kingdom took the dramatic and decisive step of cutting the price of fuel oil by nearly 50 per cent. . . . An immense and lasting propulsion has thereby been given to the use of fuel oil throughout British industrialism; and its superior efficiency, cleanliness and simplicity, the comparative inexpensiveness of its installation, and the saving it effects in labour costs, have received a demonstration in the past ten weeks such as ten years of propaganda in ordinary times could hardly have brought about. . . . Apart from all questions of relative costs, of calorific values and of overhead expenses, what power-users in this country are fast coming to recognise is that when they turn from coal to oil they are getting security. The coal industry has been so bedevilled by the combined stupidities of the Government, the miners and the owners that manufacturers and consumers can no longer rely on it to furnish the raw material they must have if they are to carry on at all. It has forfeited the public confidence. It has ceased to function as a trustworthy factor in the national economy. At any moment it is liable to be so violently disrupted as to be put out of business altogether. The oil industry, on the other hand, is and always has been wholly free from these convulsive dislocations. It has never failed to deliver the goods. It can be implicitly trusted to produce and to distribute up to the maximum of its capacity. The British coalowner and the British miner would be well advised in taking the oil menace seriously. It portends the certain relegation of their industry to a subsidiary place unless they set about its drastic reorganisation."

STATE OF THE GERMAN ENGINEERING TRADE.

Mr. P. Harvey Middleton, assistant manager of the International Trade Service of the Guaranty Trust Company of New York, has just returned from a tour of observation in Germany, during which he visited Berlin, the great industrial centres of Essen, Dusseldorf, Dortmund, and travelled through the agricultural districts between Berlin and the Dutch-German frontier. The following is an extract from his report:—

"Through the courtesy of Mr. A. Dunning, Secretary of the American Association of Commerce and Trade in Berlin, I was able to visit Krupps' Works at Essen, and on 16th June was taken over the various workshops by Mr. Herman von Verschuer. In the great locomotive shop heavy locomotives are being turned out complete at the rate of one a day. In another shop goods wagons are manufactured at the rate of eight a day, and in another 5-ton motor lorries are being manufactured alongside of small motor scooters. Every part of the lorries is made in this shop, with the exception of the rubber tyres. The manufactures of Krupps' Works cover a surprisingly wide range. They include railway supplies of all kinds, machines for textile and paper industries, dredges, floating docks, pneumatic tools, surgical instruments, Diesel engines, doors for safes, cash registers and adding machines, apparatus for moving pictures, etc. They are also manufacturing machines for making artificial teeth, and, in fact, the artificial teeth themselves. At Krupps' Germania Shipbuilding Plant in Kielgaarden they are building passenger and freight steamers. These Krupps' works are turning out this large variety with the same workmen who made war munitions, and to-day they are actually employing more men in these works than they were before the war.

"I also visited the Rhein Metall Fabrik, Dusseldorf. This plant had also readjusted its operations from a war to a peace basis, and is to-day one of the leading railway rolling stock industries of Germany. In less than a year they have turned out a thousand locomotives, a thousand goods wagons, and their present monthly production is 30 locomotives and 300 freight cars. Like Krupps, this concern employs more men to-day than it did in 1914, and is executing a large volume of foreign orders.

"The eight-hour day introduced immediately after the revolution is still generally in force, but the introduction of piecework on a larger scale than ever before has resulted in some cases in a 10, 12, 13 and 14-hour day. The interest in the so-called Workmen's Councils is waning, because when these meetings are called during working hours the men are unwilling to leave their work and thus decrease their earning power.

ENGINEERING SECTION.

South African Institution of Engineers:

ACTING PRESIDENT'S VALEDICTORY ADDRESS.

The following is an extract from the address delivered by the Past Acting President (Mr. R. C. Atkinson) of the S.A. Institution of Engineers at the June meeting:—

It is customary, on this, the last general meeting of the session, for your retiring president to deliver his valedictory address, and his official leave-taking as such affords him the opportunity of reviewing the work accomplished during his year of office, and of expressing at the same time his appreciation of the loyal assistance and support accorded him by his Council, with a special word of praise for your hard-worked secretary, and last, but not least, your honorary treasurer. Your retiring president having left for England in March to enjoy a well-earned rest after a strenuous year of office, not only as president of this institution but also of the Mine Managers' Association, we are this evening not only deprived of the pleasure of his company, but also of his address. You will remember that Mr. Whitehouse made up for this in a great measure by giving us an able address on the Low Grade Mines Commission's report at the March meeting immediately prior to his departure.

It is not my intention this evening to review the work of the past session in a manner such as might have been adopted by Mr. Whitehouse; you will, I am sure, realise the difficulty in which I am placed in this respect as incoming president, with the prospect of having to deliver my inaugural address in the near future, but with your permission I hope I may be allowed to refer to one or two items which have loomed rather largely in our proceedings during the year.

Co-operation of Scientific Societies.

In addition to your annual report and balance sheet, you have had placed before you a *precis* of the proceedings at the first annual meeting of the Associated Scientific and Technical Societies held on 16th February of this year. The extent of your interest in this, the closer working and joint housing of the technical and scientific societies on the Rand, is shown by the generous amount which your institution has subscribed to date, and this is also an indication that the new venture has your unanimous support and backing. It is not necessary to recapitulate all the details of the original movement which led up to the Association being formed and to the acquisition of this handsome building in which the associated societies are now housed, but I do think that it is incumbent on the presidents of all the societies to impress upon their members the vital necessity for each individual member to do his utmost in order to ensure adequate funds to make the new venture a success compatible with the dignity of the associated societies.

The Electricity Bill.

Reference is made in your annual report to the Electricity Bill, and the opportunity offered to your institution to criticise the Draft Bill as drawn up by the Government Drafting Committee. The Electricity Bill is an indication that our Government is alive, not only to modern requirements and demands, but to the economy to be effected by central supply. Cheap electrical power will be a potent factor in the starting and development of industries, inasmuch as the expensive installation of boiler and engine plants will be obviated, together with its attendant wastefulness in the consumption of fuel in comparatively small and imperfect units. The appliances available for the conservation of heat units in large power stations are usually neglected in smaller installations, and for this reason if no other the adoption of large central supply stations is to be welcomed. The necessity for cheap and abundant electrical power is one which cannot be gainsaid, and any efforts made to bring this about is worthy of the support of the public. The desire of enterprising individuals or companies to carry out useful undertakings should be assisted in every way by Government, and not hampered or rendered unduly costly and complicated by legal requirements or by unnecessary Government supervision and restriction. The adoption of electric drives or appliances in the factory and industries generally, business places, places of amusement, aye, and the home, is daily becoming more general. Speaking of the home, one is led to think of the domestic question, which to-day is one of the most complex, most perplexing and vital throughout the world. It is one of the difficulties which, like so many other questions, will have to be solved by the engineer. Half the labour in a well-kept home is entailed by the removal of dirt arising for the most part out of the methods of providing heat. The world is at last awakening to the fact that the wicked waste of burning raw coal under any circumstances, without utilising the by-products contained therein, is commercially unsound, and this can only be obviated by the availability of cheap electric power, or even gas. To-day we in South Africa are probably placed in a more advantageous position as regards domestic help than most parts of the world, by virtue of the domestic Kaffir. But the day is drawing near, I trust, when the native manservant will not be allowed in a house, and quite rightly so; cheap electric power to make electric cooking and heating possible, will solve half the difficulties of the servant question. It must be cheap enough to be available not only to the few, but to all. It would be interesting to know what the cost per unit would have to be in order to compare favourably with the cost of present methods, also the cost of installations for an average-sized house. I remember we had a paper on this subject some years ago; the cost then was given as three times the cost of coal, based, I presume, on Johannesburg municipal charges. With the advent of large electricity supply undertakings, the comparison would, no doubt, become more favourable to the electric installation. Gentlemen, if as engineers you wish to keep up your record as benefactors of mankind, I commend the study of this to your consideration.

Referring for a moment to the Advisory Board of Industries and Science, I think your Council is to be complimented on the success which attended the representations made to Government calling attention to the fact that no members of the engineering profession had been appointed thereon. This was obviously an oversight, as one can scarcely imagine such a Board to be complete without the inclusion of engineers. As you are aware, the omission was tactfully remedied, and two of your past presidents were appointed to the Board. I am quite certain that their wide experience and practical knowledge will be of great assistance in promoting the objects for which the Board was formed. It will be generally recognised that the inclusion of members of your institution will bring to the assistance of the Board not only the personal experience of these gentlemen, but, if necessary, the collective weight of the influence of the institution as a corporate body. We are all anxious and willing to aid the Government in any undertakings which are promoted with the object of creating industries and thereby helping to build up a prosperous South Africa.

Witwatersrand University.

As reference has been made in your annual report to the resolution passed by the members of this Institution in March last with regard to the necessity of the establishment of an independent University on the Witwatersrand, and in view of the support which has been accorded by this institution since the inception of the movement some five years ago, I feel sure you will join with me in expressing our satisfaction that the efforts of all those who have worked so strenuously to attain that object have at last been crowned with success.

Referring for a few moments to the student section of this institution, may I say that your Council has given more than passing attention to this, in their endeavour to encourage the future engineers of South Africa to meet in order to read and discuss papers, thereby preparing themselves for the more serious efforts which will be expected of those who wish to excel in their profession. It is to be regretted that a greater number do not avail themselves of this opportunity. The average attendance of 17 out of 100 at each meeting is not indicative of great enthusiasm. I would point out that the work entailed in the organisation of the section is no greater for an average attendance of 70 than it is for 17, and I would earnestly urge all students who ultimately hope to adorn their profession to take advantage of these student years, in order to become accustomed to speak without restraint among their fellow-men, and to give clear and lucid expression to their views. They will find that the habit acquired while their characters are still in the plastic and impressionable stage will determine in a great measure the role they will assume in the future. Young engineers cannot too early realise the importance of attending meetings, joining in discussions and contributing papers; it engenders a confidence and resource which is more and more difficult to acquire as one gets older. Success depends not only on the acquisition of knowledge; other qualities must be developed. The knowledge you may have acquired is of little use unless you can give expression to it. To be a successful engineer means hard work for the love of the profession, but as engineers also have to live it is necessary to acquire and develop lucid expression of their knowledge not only on paper, but by word of mouth, either in debate or in explaining their requirements to others who may be wanted to carry out their instructions.

I cannot close my address, which is already too long, without expressing appreciation of the papers, twelve in number, read during the past session. These go to show that the engineers and technical men generally of these fields are in no way behind those in other parts of the world, either in their knowledge of the up-to-date appliances available or their courage in the application of these to problems in mining and engineering. In this connection I would say that while it may not be possible for all members to read papers on such important and highly technical subjects as schemes for working a mine at a depth of 7,000 ft. or the efficient use of physical and human energy in such mines by the study of the influence of atmospheric conditions on fatigue, it lies within the power of most of us to come forward with our daily troubles; I know full well that engineers on these fields are daily faced with problems which call for the ready thought and engineering instinct which a trained and resourceful engineer alone can bring to bear on their solution. It is the correct handling of these difficulties which make for economical working or otherwise, and the true objects of our institution are not fulfilled if these difficulties and the methods employed in their solution are not brought to light for the benefit of other members. I would, therefore, appeal in the strongest manner to our members to come forward with papers on these subjects. It is within my knowledge that some of the most valuable work effected by our engineers on these fields never sees the light, and the authors, either through shyness or modesty, are never known. As you are aware, provision is made monthly in our agenda for items of practical interest; these can be published or not as may be desired by the authors. It is such matter which is necessary to make our institution of mutual benefit, and I trust that my year of office will be remembered as a year of great activity in this direction. Gentlemen, I look forward to a very successful year of office, but this can only be accomplished if I have your support in the direction mentioned.

THE POSITION IN THE ENGINEERING INDUSTRY.

The British Engineers' Association (32, Victoria Street, London, S.W.1), in a statement dealing with the present position, point out that even before the national stoppage of work in the coal mines a critical situation was rapidly developing in the engineering industry, because costs of production were far too high in relation to the purchasing power of an impoverished world, in which many prospective customer countries were further restrained from buying by adverse exchanges, entailing insupportable losses. A contributory cause of the loss of trade was the ability of the United States, Germany and Belgium to undersell. To the extent that Germany has been able to produce and export, the depreciation of her exchange has enabled her to quote prices with which the British engineering manufacturer could not possibly compete. In a lesser degree this also applies to Belgium.

"In spite of strenuous efforts by directors and managers, our engineering firms are quite unable to secure the volume of business required to replace the orders executed during the last six months or now rapidly approaching completion. The fact is that, although the world is in urgent need of vast supplies of products of engineering industry, to make good the losses due to the war and increase the future rate of wealth-production, these supplies cannot be ordered until prices are brought within the purchasing power of the customer. This applies even to the home market, where many big schemes are being held in a state of suspense because of the prohibitive cost of carrying them into execution at present prices. To the extent that our competitors can undersell us, they will not only capture the overseas trade, but also invade our home market.

"It must not be imagined that the resumption of coal-mining will by itself revitalise the engineering industry, even though the settlement be on terms consistent with a low enough price for industrial coal. It cannot be too clearly and widely understood that the engineering industry has no chance of recovery unless and until a substantial reduction has been made in the costs of production. This is the problem to be solved, and, failing its solution, other considerations will be of little more than academic interest. At some time, in the not very distant future, masters and men will be compelled by the pressure of stern necessity to compose their differences and agree upon a *modus vivendi*. Delay in making this great constructive effort will merely increase the amount of leeway to be painfully and laboriously recovered, and imperil the chances of ultimate success."

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Automatic Incline Haulage with Intermediate Landings.

The North of England Institute of Mining and Mechanical Engineers at Newcastle-on-Tyne, on June 4th, discussed the interesting paper by Mr. E. W. Milburn, in which he described a self-acting haulage system devised for dealing with the face-haulage in bord-and-pillar workings, where the inclination of the seam changed suddenly from about 1 in 12, where ponies were used, to from 1 in 4½ to 1 in 3, at which inclinations it was impossible to use animal power.

The method of working adopted when the inclination changed was to drive places 9 feet wide and 60 yards apart to the full rise, and turn level places off these right and left at intervals of 18 yards, in order to form pillars measuring 60 by 18 yards. The pillars were afterwards extracted on a long-wall face, and the coal brought out along the original level roadways and lowered down the rise places by means of the self-acting haulage system.

The problem of dealing easily at this inclination with several intermediate hanging-on places was solved very satisfactorily by the following arrangement. A double track of 24-inch gauge was laid up to the 9-foot rise wide places. At the bottom, top and every intermediate hanging-on place two square turn-plates were laid side by side. The turn-plates were 4 feet square, so that the interval between the double way was 24 inches. A 2½ feet diameter pulley was mounted in a wooden frame at the top of the rise, with a brake-strap operated by a light wire rope running down the side of the rails from the top to the bottom, and held off the wheel by a weight when not in use.

An over-tub endless rope 3-8in. in diameter passed half round this wheel and thence to the bottom of the system, where it returned round a pulley with a screw adjustment for taking up slack rope. In action the full tubs always ran down one track and the empties up the other.

One full tub at a time was attached to the endless rope, either at the top or at any intermediate hanging-on place, by means of a lashing chain. One empty tub was attached to the rope in the same manner at the bottom. On the full tub being pushed over the turnplate, the system was braked by the side-brake wire-rope from whatever hanging-on place the full tub left. The empty tub on completion of the run (the full tub being at the bottom) necessarily arrived at the same hanging-on place that the full tub had just left. Only two lashing chains were used altogether, and on changing from one hanging-on place to another the attendant carried one chain with him.

Any number of runs can be made from any hanging-on place at will, and places can be turned away to right or left of the tracks with equal facility. The attendant deals with all coal as it is brought out of the various levels. A boy hangs on the empties at the bottom and takes the full tubs off.

A speed of two hundred runs in eleven hours has already been attained, and this is not by any means the full capacity of the arrangement. The greatest length of incline worked is 100 yards, with a gradient of 1 in 4. The tubs pass over the type of turnplate adopted with the greatest ease at the intermediate hanging-on places. The weight of a full tub is 13¼ cwt., and of an empty tub 4¾ cwt.

DURBAN MILLION-POUNDS HARBOUR SCHEME.

The Harbour Engineer at Durban has just been explaining to the Chamber of Commerce there his new scheme for the development and improvement of the port.

This is not only on the grand scale, but involves radical and far-reaching changes in the very aspect of the town itself. When the local public fully realise what is under weigh, there can be little doubt that the harbour question will become the burning question of the hour.

The new scheme is to cost over a million pounds, which is not yet voted by Parliament. Also, it is to occupy five years in the carrying out. Nevertheless, the coming visit of the Minister of Railways and Harbours, Mr. Jagger (and several Parliamentarians who are to accompany him), will apparently see the question decided once and for all. If they approve, the new scheme is as good as adopted.

To the man in the street, the most interesting point about the scheme will be, perhaps, that it will drive back the bay from the Esplanade altogether. There will be a dock for small boats and yachts at Albert Park, and this will be the only way of access to open water. Gardiner Street jetty will be done away with, and all that area filled up with soil to a width of 600 feet. Beyond that there will be a railway line right across from Congella to the present Point railway. There will be four railway lines to begin with, and several more will probably have to be laid down to carry all the traffic.

The commercial community, as represented by the Chamber of Commerce, favours the new harbour scheme.

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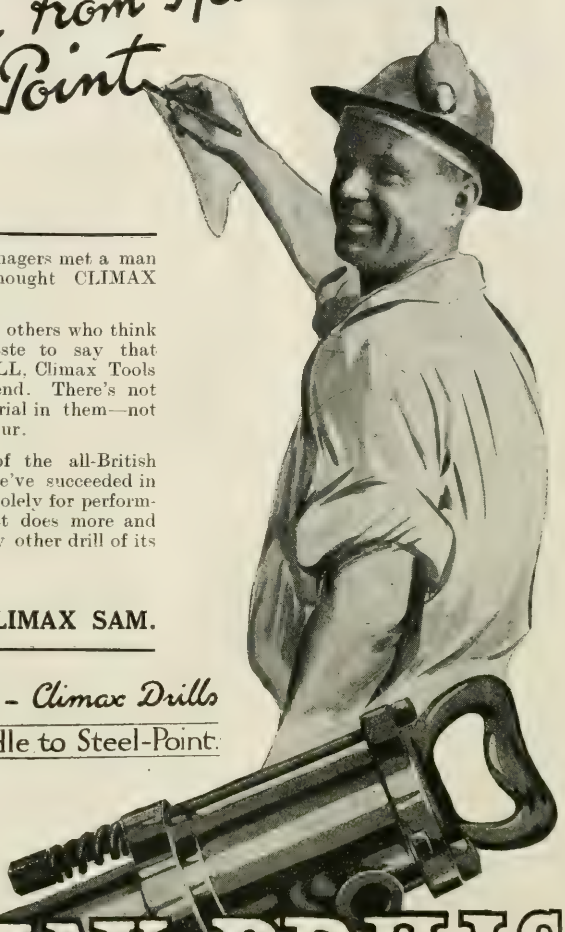

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Mining Efficiency on the Rand.

[The following paper, read by Mr. F. C. W. Ingle before the S.A. Institution of Engineers, deals with a subject of paramount importance on the Rand to-day. We print the first instalment of the paper in this issue.]

The object of this paper is to draw attention to some of the factors which very materially affect efficiency in our mines. Some of these factors are well known, but my excuse for dealing with them is that their importance is so great that it cannot be too often or too strongly emphasised.

All the world over comparisons are being made between haphazard and stystematised work, and adways to the advantage of the latter.

It would seem that we are, on the Rand, in an exceptional position to standarise most of our mining processes.

Most of our unskilled labour is of a low mental standard combined with great physical strength, a combination that makes it eminently suitable for the performance of mechanical tasks. Though usually devoid of initiative, the native can be taught to do any manual work in a definite way, and will continue indefinitely in the way he has been taught, though, naturally, without careful supervision, he will become slovenly in his methods.

If these premises be accepted, it must be admitted that it would pay to teach the native the right way to perform any work which is allotted to him, and if this were done the result of his labours would be much greater than if he were permitted, as is invariably the case, to take his instructions from slovenly fellow-workers, and so acquire at the outset the very poorest methods of work.

That he could easily be taught the right way to carry out each function of the work required of him, it will be the endeavour of this paper to show.

For that purpose we will consider the principal classes of mine labour under the following heads:—

(a) Shovelling and tramming.
(b) Hammer boys.
(c) Machine boys.
(d) General.

Shovelling and Tramming.

It has been found that the weight of the shovel and its load are very important factors affecting the output of work of shovel labourers. From careful experimetnal work done in other countries it has been found that the maximum of work done is secured when the loaded shovel weight is 21lbs.; allowing 6lbs. as the weight of the shovel, that of its load is 15lbs. If the load be increased or decreased the output rapidly decreases. On these fields our average shovel weighs 5½lbs. and holds 12lbs. of rock. It is imperative, therefore, that we should see that our boys are equipped with good shovels, and that these be withdrawn as soon as the holding capacity of the shovel is affected by wear. The cost of the shovel per shift of its life is in no way comparable with the cost of the boy's labour per shift.

Experience has shown that men trained to use a shovel properly, taking the right intervals and duration of rest, are able to handle several times as much material as untrained men do, though the latter may expend quite as much physical energy as the former.

Every underground worker must have noticed the slovenly scraping of rock along the footwall which in our mines passes for shovelling. A more inefficient process, and one more wasteful of time, money and energy, it would be difficult to conceive, and yet this is the system which appertains with 20 per cent. of our underground labour. It is not shovelling, but scratching, and would appear to have been devised for the special purpose of wearing out shovels.

It would be quite a simple matter to train a staff of native supervisors, who would work under a white instructor. This man, assisted by his native staff, would have charge of one or more stopes, where all new shovelling and tramming boys would learn to carry out their work in an efficient manner—*i.e.*, to lift the rock on the shovel and throw it, instead of pushing it along the footwall. Here they would remain until the correct method of work had become thoroughly instilled into them. This might take from ten days to three weeks, when they would be drafted throughout the mine where required.

Every shovelling and tramming boss-boy should be specially trained for his work in a training school, and his duty thereafter would be to see that the native under him did not fall into slovenly methods. To ensure the efficiency of the gang under them suitable rewards could be distributed periodically to the boss-boys.

Hammer Boys.

Hammer boys, in a similar school, should be instructed how to hold a hammer; how, with the rhythmic sway of the body, to add force to the blow with the least expenditure of energy, to strike a square blow on the steel; and how to manipulate their jumpers so as to avoid getting "faseela." A very large proportion of our hammer boys, otherwise quite expert at their work, have a ridiculous habit of striking the jumper head on the side, thus burring up the steel most wastefully, imposing unnecessary strain upon the hammer, and losing some of the effectiveness of the blow. Here, again, boss-boys of these gangs should have to pass a special qualifying test in instructing in this work, so that they may be in a position to correct slovenly habits, which are bound to develop in the gangs if not checked.

Machine Boys.

In a similar school the machine boy should be taught the importance of proper alignment of the machine with the hole being drilled, and the importance of sufficient and the uselessness of excessive lubrication. He would be taught that his machine, in spite of its apparent invulnerability, is in many respects a delicate mechanism, and should not be struck with a hammer when, due to bad alignment or other cause, the jumper jams. This could very easily be impressed upon him it he were shown, for one short hour, the disastrous dents made in cylinders by such persuasive tactics. The importance of keeping dust out of the machine would be demonstrated, and at the same time a number of other important points would be so impressed upon him that he would retain them by force of habit, such as:—

(a) That all nuts and bolts on his machine and cradle are kept tight, which would prevent the machine and cradle from falling into the deplorable condition of slackness one so often sees, caused by the loss of belts and nuts.

(b) That leaks in air and water hoses are eliminated, so that the machine will get its full supply of air. If this were required of the machine boy a far greater measure of care would be exercised by him in the preservation of his hoses.

(c) That connections of hoses to machines and to pipe terminals were made with proper gaskets, so as to eliminate wastage and loss of power due to leakages at these connections.

(d) The regular greasing of bar screws, clamp nuts and bolts, so that these will work easily and quickly, instead of, as one often sees, requiring a tommy bar or spanner to move them.

General.

In the same way timber boys, pipe and track boys, and all classes of native labour should be instructed to carry out the tasks which fall to them in a workmanlike manner, and at the same time, instruction in Safety First principles and the rudiments of First Aid should not be neglected.

If the advantages of a good initial training are not to be lost by subsequent slovenliness, it is essential that all natives who are placed in charge of gangs be made to pass a qualifying test, under practical conditions, not only as to their ability to do the work required themselves, but to impart their knowledge to those under them. Such examinations should be conducted in the established schools.

The greatest obstacle to the adoption of such a system would lie, I am afraid, in the resistance or indiffrence of the white workers, and I am at a loss to suggest how they may be trained to encourage workman-like methods amongst their gangs. It is obvious that slovenliness on the part of the white ganger will do more to undermine the best teaching than any other factor, and I believe it would only be by diplomatically interesting the white miners in the whole movement and educating them to believe in its value that their support would eventually be secured.

All these things we all know, and attempts have been made on practically every mine on the Rand, at one time or another, to correct the obvious deficiencies in our present system, but our efforts have been half-hearted, and the attempt has either dropped out completely or been allowed to disappear in the background. And yet no thinking man can fail to realise the immense importance of such a training. Our industry would benefit out of all proportion to the cost and labour expended on it if such a scheme were determinedly introduced throughout the Reef.

We should be able to draw our white, and perhaps some of our native, instructors from the Miners' Training School, where they would have been specially trained for the purpose, and it would be a great advantage if the white trainers were to have a working knowledge of the native languages.

Throughout, this work should be under the active supervision of a department in the group of each mine concerned, or preferably under the Chamber of Mines, to prevent the failure of the scheme through lack of interest or slackness on the part of the management of the individual mine.

At first glance it might appear that these porposals are too elaborate and would entail too great a cost, but there can be no doubt that if the scheme is carried into effect with sufficient thoroughness and determination its result would abundantly justify its cost.

Mining Tools and Supplies.

Though I believe that every effort should be made to reduce the cost of stores and their wasteful usage in our mines, I think that too often the economies effected in this direction result in loss of efficiency which would appal the responsible official could he translate the loss into £ s. d. It is very unfortunate that while the saving of a sum of, say, £2,000 by the parsimonious issue of stores is a visible and tangible figure pleasing to the management, the lost tonnage and profit due to a decline in efficiency resulting therefrom is not assessable, though its influence may continue for many months after the normal issue of stores is resumed. It often happens that stores are issued freely during the earlier part of the month, and in the latter part the endeavour to reduce the stores bill to what is considered the desirable figure results in a severe restriction being placed upon the issue of stores; thus we have alternating periods of plenty and scarcity. This system is misleading and uneconomical, and it would surely be better to be continuously watchful and to have a uniform issue throughout the month.

We often hear complaints that men are unable to do full work owing to an insufficiency of drill steel in the mines, or to interruptions in the air and water service. These complaints are general throughout the industry. My experience on a number of mines is that too often this complaint is justified. I have come into contact with officials from all mines on the Rand, and have been able to discuss with them the cause of the poor machine efficiency experienced on so many mines, and what one hears only confirms one's own experience that steel is often doled out far too sparingly.

Can one wonder that efficiency is low on a mine when the end of the shift? The time of the miner and his boys often the supply of steel is exhausted an hour or more before is then wasted for the remainder of the shift. Supposing another two holes could have been drilled by each machine, another 12 tons would have come from that gang. If this be the case in half a dozen stopes, seventy tons are so lost each shift, which by the month-end becomes 1,790 tons, and this loss of tonnage would probably mean a net loss of profits of, say, £1,700, which could have been avoided by the expenditure of, say, £125 on drill steel.

Unfortunately, the £125 appears on the books as a definite saving. It is visible and tangible. Whereas the 1,700 tons and its equivalent £1,700 lost profit does not appear; it belongs entirely to the realms of potentiality, with which the accountant has nothing to do.

Pipe lines, taps and fittings are sometimes allowed to get into a condition of disrepair that result in a constant loss of air and water, each perhaps small in itself, but in the aggregate sufficient seriously to impair the general pressure. Bursts and breakages occur repeatedly, throwing so many machines idle for half an hour or half a shift.

Again, the cost of maintaining the air and water columns in good condition is very obvious in the store books at the end of the month, and for the mine captain concerned leads to some very awkward question from his seniors, whereas the insidious and continuous loss of tonnage is scarcely noticed.

Often as an indirect result of the grudging issue of stores pipe lines are installed of too small a bore for the number of machines to be run on them, and so a dozen or more machines may struggle along indefinitely on half rations of air and water, and from all the labour attendant upon them a distressingly low efficiency is derived.

The many varieties of fittings for pipes are also responsible for great waste of time. A new hose is sent to a machine man, who discovers that the connections with which it is equipped will not fit the spud on the pipes or machines. He wanders away to ask his neighbours if they can supply him with a suitable spud, or perchance may discover one in a disused tap on the pipe line along the drive; but, on the other hand, he may try half a dozen different spuds which fail in any one of several dimensions.

On one occasion I collected in one drive no less than nine different 1in. spuds, no two of which would fit the same connection, the pitch of the threads and the diameters being endless in their variety.

I noticed from a Chamber of Mines report for 1905 (16 years ago) that a committee was then sitting to standardise pipes and pipe fittings. Since then such committees seem never to have stopped sitting, and though a great improvement has been effected, there remains much to be done before waste due to lack of standardisation is entirely eliminated.

When we consider the deplorably short time in each shift which is available for drilling under present working conditions, it is apparent that niggardliness in the issue of stores, which results in making further inroads into the available drilling time, is a false form of economy.

By all means let each official satisfy himself that stores are not wasted, but when he has done this he would do well to consider whether by excessive economy he is not bringing upon his mine losses far greater than the savings he may make in his stores bill.

I have known officals who by regularly cutting down each order by half fondly imagine that they are effecting an appreciable saving, whereas probably most of the men, being aware of this habit, quietly double their orders and so obtain what they require. Less fortunate ones, requiring say four taps to carry out a job, are only equipped with two, which results in two machines hanging up until the following shift. We must trust a man until we find him untrustworthy, and then we have either to teach him the value of truth or replace him with one who can be trusted.

Niggardliness in timber supply is liable to result in disastrous losses, sometimes reffected in the increased incidence of accidents, more often in the caving of stopes. Who can tell what the reopening of these stopes will cost or the cost of resultant disorganisation, or the value of broken ore buried under the fall never to be recovered?

The remedy for high stores costs lies in the closest watchfulness. It would probably pay to put up a prominent notice showing the cost of the commonest articles of stores used, thus:—

"A one-inch cock costs 12s. 6d.
A timberman's axe costs 9s. 2d.
A wrench costs 9s. 4d.
A shovel costs 7s."

At one time the writer had a note prominently stencilled on each case of explosives used, thus:—

"One stick of powder costs you 4½ pence."

The trouble was worth the effect.

Every mining engineer is aware of the fact that our machines are in use less than half the time the miner is underground, whereas it is drilling actually less than one quarter of the time. A jackhammer will drill on an average two inches per minute. The average footage drilled per machine shift is fifteen feet. In actual drilling time this would take ninety minutes. The balance of the time is lost in the miner getting to and from the stope, dressing and wetting down, rigging up and down, machine repairs, and, shown above, by insufficiency of drill steel, greakages thereof, and failure of air and water supply.

As we have seen, injudicious curtailment of stores is responsible for a considerable loss of efficiency. In exactly the same way, careless or too economical work in the drill shop is responsible for serious losses.

Steel must be accurately gauged and tempered. As a general rule, the importance of this matter is not recognised. The average from a jackhammer hole is 1½ tons of ore. I think that not less than 10 per cent. of the holes are lost owing to defective drill steel. Sometimes the gauge of one piece is wrong and the succeeding jumper will not follow. Reluctant to abandon a partly drilled hole, the operator endeavours to enlarge the tight part and complete it. But whether the attempts are successful or not, they absorb much time. Sometimes the bit may be burnt or too highly tempered or soft. But whatever the fault, valuable time and sometimes a hole is lost. For every hole so lost, directly or indirectly in equivalent time, 1½ tons of ore are irretrievably lost. The value may be taken at 15s. to £1 per ton. Thus each hole is probably worth to the mine from 22s. 6d. to 30s. With 100 machines in use on a mine that would represent, say, 60 holes, or a loss of from £75 to £90 per shift, or £2,000 per month, from this source on that mine.

These figures seem incredible, but are nevertheless true.

Defective steel should be picked from the drills as they come from the mine each day and carefully examined by a drill smith, or, as often as possible, by the engineer. And obviously, before sharp steel is sent underground a similar inspection should be made by a responsible man and defectives eliminated.

In the same way it can be shown that a defective water service represents in unearned profits amounts that are astounding. Too much care and attention cannot be paid to the conservation and distribution of water.

In this paper I have dealt more on machine work than on any other class of mining work, but many of the remarks apply equally to other departments. I have gone so closely into the losses occasioned by machine work because it seems to me that there is no greater inefficiency, in comparison with what is possible, than we see in machine stoping, unless it be the very wasteful use or misuse of invaluable human energy in hammer boy work, where the output is approximately one ton per boy per shift, as compared with probably three times as much per boy where machines are used; and if the output of 20,000 natives now employed as hammer boys could be increased threefold by their use on machines, we should hear less of the insistent cry of scarcity of native labour.

The use of jackhammers renders the heavy blasting accompanying machine work in the past unnecessary. I have had an average efficiency of explosives from jackhammer holes, on an extensive scale of operations extending over eight months, of 7.2 fathoms per case of explosives, as against 5.6 from hammer bor work in the same class of ground. This has been obtained by the systematic drilling and blasting of holes. The only valid reason for the use of hammer boys at the present time is in cases of isolated patches, pillars, etc., or where a mine is approaching exhaustion and is not equipped for machine work.

One further factor which would help very materially to reduce working costs is, to my mind, to be found in intensive mining, or concentration of operations. When I have claimed in the past to have obtained very high efficiency from machines I have been accused of "spoon-feeding" the miners. Nevertheless, the cost per fathom or per ton broken, including all costs for the rock delivered into the shaft bins, reflected a very considerable saving as compared with costs under other conditions. If, then, these places had been "spoon-fed" the result amply justified the treatment. In other words, it would pay to "spoon-feed" the whole mine.

Practically the same number of workers are required if 40 fathoms are broken in a stope as when 60 or 80 fathoms are broken.

If by intensive mining 1,000 tons a day can be got from one level instead of from several levels by ordinary mining, the costs in many items will be considerably reduced. It is impossible to treat the subject in detailed form, but if it were introduced as a general policy the reward would be substantial.

One might just give as instances that—

(a) The rapid general advance of the stoping faces would mean a considerable reduction in the cost of support of hanging.

(b) Whilst it is often necessary to put a timberman in charge of each stoping face, the introduction of anything like the long wall system would enable one timberman to supervise a larger gang of natives if these were working close together, as they would be in intensive mining.

The Coal Control.

The Prime Minister, Mr. Hughes, stated recently to a deputation that the Commonwealth Government was anxious to relinquish the control of coal, or any other commodity, as soon as possible. This system of control of export was set up in Australia, as in other countries, during the war, in order to ensure a sufficiency for local requirements. Messrs. Earp and Reid, representing the Newcastle Chamber of Commerce, pointed out that the overseas trade was in jeopardy, and much of it would be lost beyond recovery unless immediate steps to retain it were taken.

The State coal mine at Baralaba, Queensland, commenced coal production in January with 75 tons. In February the output reached 746 tons, and has increased considerably since then. The Railway Department is taking the whole of the output. The Minister for Mines anticipates that in about a year's time the district will be producing coal in excess of local requirements. The Mount Morgan Company's tunnel is in 95 ft., but has not yet reached the seam

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The Week in the Sharemarket.

IMPROVEMENT NOT MAINTAINED—SOME PROFIT-TAKING—BETTER OUTLOOK.

Up to Thursday the market showed distinct signs of improvement this week, but profit taking then began to make itself felt. The cables from London are more cheerful, and all the good factors enumerated in this column last week remain. In addition, the gold premium continues to rise with the fall in sterling and touched 115s. according to latest advices. There seems every likelihood that the premium will increase in the near future, and thus temporarily relieve the position of the low grade mines. All the gilt-edged gold stocks are firmer in sympathy with the higher premium, and Far East Rand dividend payers are a steady market. On the West Rand, Randfonteins are also in favour and have appreciably firmed up on the better outlook at the mine, and the bigger profits in sight. Diamonds, in view of the improving prospects of the market for the stones, have likewise improved; and Consolidated Diamonds in particular made a notable advance during the week. The improvement was not fully maintained, however, owing doubtless to profit-taking, but quotations remain firm at a little under the top prices touched. In the diamond as in the base metal market, of course, everything depends on business conditions throughout the world generally, and any big revival of trade in America and on the Continent would soon be reflected in the demand for these products of our mines. In the base metal industry as in the diamond trade, there are now appreciable signs of an early recovery, and it may be that in these industries we are now experiencing "the darkest hour before the dawn." It is noteworthy that competent authorities in New York think that business will improve in the second half of the year. Moreover, Russia is said to be coming back to a business basis, and Germany, by all accounts, is rapidly getting into her stride as a producer and consequently as a consumer of raw materials. These things all augur well for our base metal mines.

	Fri. 15th.	Sat. 16th.	Mon. 18th.	Tues. 19th.	Wed. 20th.	Thur. 21st.
Anglo-Amer. Corp.	19 6*	19 9	20 6	21 10½	22 0*	21 6*
Apex Mines	—	—	6 9*	—	—	—
Bantjes Cons.	4 9*	4 6*	4 8*	4 10*	4 10*	4 9*
Brakpan Mines.	—	—	—	—	53 0*	—
Brick and Potteries	—	4 0*	—	—	—	4 0*
Bushveld Tins	—	—	0 6*	0 7*	0 8*	0 8*
Cassel Coals	—	25 0*	—	—	—	—
City and Subs.	2 0*	—		—		2 0*
City Deeps	45 0*	46 0*	46 0*	47 0	46 9*	46 9*
Clydesdale Colls.	—	26 0*	—	26 0*	—	—
Con. Diamonds	13 6	13 10½	15 9	16 9*	16 6	15 3
Con. Investments	—	—	—	21 3*	21 3*	—
Con. Langlaagtes	11 0	11 0*	11 0*	—	11 6*	11 6*
Con. Main Reefs	—	10 6*	11 0*	9 6*	9 6*	9 6*
Con. Mines Select.	13 6*	14 0*	14 0*	14 0*	14 0*	14 0*
Coronation Colls.	—	—	—	40 0*	40 0*	—
Do. Freeholds	0 6*	0 10*	0 11*	—	0 11*	1 0*
Do. Syndicates	7 0*	6 9*	6 9*	—	7 0†	
Crown Diamonds	3 7*	3 9*	3 9*	3 5*	3 7*	3 6
Crown Diamonds	—	35 0*	—	—	37 0*	—
Daggaftn. Mines	3 3*	3 3*	3 3*	3 5*	3 3	3 0*
E.R. Coals	—	—	—	2 3*	2 1*	2 0*
E.R. Deeps	0 6*	0 6*	—	—	0 7*	0 7*
E.R. Minings	8 0*	—	—	—	8 3*	8 0*
E.R. Props.	4 10*	5 1*	5 1*	5 6†	5 0*	5 0*
E.R. Debentures	£67½*	£67½*	£67½*	£67½*	£69½	—
Eastern Golds	—	0 7*	—	0 7*	0 7*	0 7*
Frank Smith Dmds.	3 4*	3 3*	3 9	3 11*	3 10*	3 10*
Geduld Props.	49 3	49 6	49 6*	50 3*	50 0*	50 3
Glencoe Colls.	14 6*	14 6*	—	14 6	14 6†	14 3*
Glynn's Lydenburgs.	10 0†	—	9 0†	—	9 3†	8 9†
Govt. Areas	78 0	78 6*	79 0*	79 0*	80 0†	80 0†
Jupiters	—	—	—	1 0*	1 0*	1 3*
Knight Centrals	4 0*	3 10*	3 9*	4 0	3 11*	3 10*
Knights Deeps	—	—	—	—	3 6*	3 6†
Lace Props.	7 3†	—	7 3†	—	7 3*	7 3*
Leeuwpoort Tins	10 6	10 0*	10 0*	10 3	10 3*	10 6*
Luipaardsvlei Est.	0 6*	—	—	—	—	—
Lydenburg Farms	5 6*	5 6*	5 6*	5 8*	6 0†	5 8
Meyer and Charltons	74 0*	—	—	—	—	74 0*
Middelvlei Est.	1 3*	—	1 5*	1 5*	1 3*	—
Modder B.'s	27 9	27 6	27 6*	27 6*	27 6*	27 9*
Modder Deeps	44 0	44 3	44 3	44 0	43 9*	43 6*
Modder Easts	11 1½	11 3	11 3	11 3	11 6	11 6
Hume Pipes	16 6*	16 0*	—	—	17 0*	17 0*
New States	24 0†	23 6*	24 0	24 0	24 0	23 6*
Natal Navig. Colls.	36 0†	36 0*	—	34 0*	—	35 3*
New Eland Dmds.	25 0*	22 6*	—	32 6*	22 0*	21 6*
New Era Cons.	—	7 0*	8 0†	—	7 3*	7 6
New Geduld Deeps	—	1 4*	1 4*	—	1 4*	1 4*
New Kleinfonteins	—	5 6b	5 6*	5 6*	5 6*	5 6*
New Modders	66 0	66 3*	67 0	67 3	67 0*	67 0*
New Unifieds	—	—	4 0†	4 0†	4 0†	3 0*
Nigels	4 0*	—	4 0*	4 0	4 0*	4 0*
Nourse Mines	7 9	7 6*	7 6*	—	—	8 0†
Pretoria Cements	47 0*	47 0*	47 0*	47 6	48 6*	48 0*
Princess Estates	1 0*	1 1†	1 1†	1 1†	1 0*	0 11*
Rouxvilles	1 9*	1 9*	1 9*	2 3	2 3	2 3
Rand Collieries	1 3†	1 3†	1 3*	1 3†	1 0†	—
Rand Nucleus	1 0*	1 0*	1 0*	1 0	1 0*	1 0*
Randfontein Deeps.		—	9 9	9 6*	9 9*	9 3*
Randfontein Est.	15 3	15 6	16 0	16 6	16 9	16 3*
Roberts Victors	8 6*	—	9 6	9 3*	9 6*	9 6*
Rooibergs	4 1*	4 0*	4 6*	4 0*	4 3*	4 0*
S.A. Lands	4 3*	4 1*	4 3*	4 4	4 3*	4 3*
Springs Mines	37 6	37 9	38 9	38 3*	38 9*	38 3
Sub-Nigels	11 3*	11 3*	11 9*	11 9	11 0*	11 6*
Swaziland Tins	—	10 0†	10 0†	—	—	—
South Van Ryns	—	—	—	3 0†	—	3 0†
S.A. Townships	11 0*	11 0*	11 0*	12 0†	12 0†	12 0†
S.A. Alkali	17 6	16 3*	16 6*	15 9*	15 6	15 0*
Transvaal Silvers	26 0*	27 3	26 6*	27 3	28 6	27 6
Tweefontein Colls.	19 0†	19 0†	—	—	19 0†	—
Transvaal Lands	16 0*	17 6	—	—	17 0*	17 0*
Trans. G.M. Est.	8 0*	8 3b	—	8 0*	8 3	—
Union 5 per cent.	—	£97½*	£97½*	£97½*	£98	£97¾*
Van Ryn Deeps	68 0*	68 0*	68 0	68 6*	69 3*	69 3*
Village Deeps	6 9*	—	—	6 6†	7 6*	8 0†
West Rand Cons.	—	2 6*	2 6	—	2 6*	—
West Springs	12 6	13 0a	12 9*	12 6*	12 6*	12 3*
Western Rand Est.	4 3	4 2*	4 1*	4 1*	—	3 9*
Witbank Collieries.	47 0†	—	—	—		—
Witwatersrands	11 6†	—	—	11 0*	—	11 0†
Wit. Deeps	7 6*	7 6*	8 3*	8 0*	8 6*	8 3*
Wolhuters	3 0*	3 6*	3 6*	3 6*	3 6*	3 9*
Zaaiplaats Tins	3 3*	3 3*	3 4*	3 4*	3 3*	3 3*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Concerning Mines and Men.

Sir Evelyn Wallers has returned to the Rand after a brief visit to London.

* * * *

Mr. E. E. Hardach, the well-known mine manager, has returned to South Africa after many years' absence.

* * * *

Certificates issued by the Mines Department for the period ending July 16, 1921:—Mine Overseers: metalliferous mines, H. J. G. C. Arndt, J. S. Duff, L. S. Gibbs, F. J. Noyce, F. C. Steinhobel, L. G. Thompson; "non-fiery" collieries, S. McGill. Mine Surveyors: P. O. Lange, R. M. Phillips. Mechanical Engineers: Mines, T. J. Campbell, G. Graham, C. H. F. Henwood, W. B. Parkinson, W. H. Roux, H. Wain; works only, P. Birkett, C. W. Curry, J. B. Jelley, H. O. Smith. Electrical Engineers: Mines, A. S. Arundel, E. Buchanan, G. Graham; works only, L. Nielsen.

J. E. PARKER, M.I.Mech.E., M.A.I.M.E., late Constructional Engineer for the S.A. Glass Works; The Coke and By-Product Works for the Dundee Coal Co.; also considerable European experience in Iron and Steel Works, desires correspondence with Companies requiring a thoroughly reliable Engineer-in-Charge.—Address P.O. Box 559, Pretoria.

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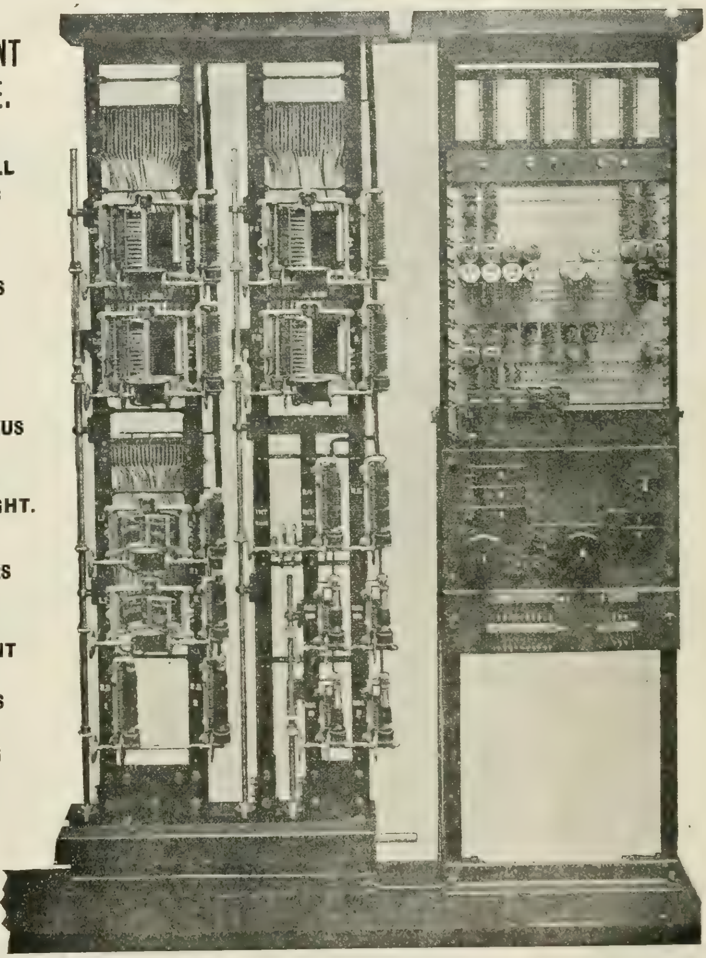

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS QUIET—IRON AND STEEL QUOTATIONS—SECOND-HAND MACHINERY FIRM—TIMBER AND BUILDING MATERIALS—WAGE QUESTIONS—OVERSEAS NOTES.

General Position.

Business generally remains much about the same; there is no activity, and prices are, if anything, inclined to go lower. On the Commercial Exchange forced liquidations are depressing things. Contrary to preconceived opinions, July is proving a worse month than June. A prominent merchant is of the opinion that the general tendency in commercial affairs is depressed, with little likelihood of any improvement for some considerable time. He thought that the shipments of wool and skins pending would improve things somewhat, but that that improvement would only be temporary. Within two or three months we might see a betterment in business conditions, but, with the lock-up of the banks and in general distribution, the relief could only be gradual. In commercial circles the view is held that, owing to the losses of the railways, we are bound to be faced shortly with increased taxation, and this is causing already not a little perturbation.

Iron and Steel.

Business has been exceedingly quiet during the week, June estimates having been stultified.

Latest quotations:—Dunswart, 29s.; Union Steel Corp., Ltd., ordinary sized rounds, flats and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 49s. 6d.; ⅜ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 49s. 6d. to 62s.; ¼ in. square iron, 55s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. to 62s. 6d ; channels and joists, 47s. to 48s.; imported angles, 45s. to 47s.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in., ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 57s. 6d.; ⅝ in., 55s. per 100 lbs.; per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. to 57s.; shovels, 60s. to 65s.; wheelbarrows, 57s. 6d. to 60s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d. per 98 lb. coils; 24s. to 25s. per 68 lb. coils, large, 12 gauge, 28s. 6d. per 96 lb. coil; 14 gauge, 22s. 6d. per 66 lb. coil; plain wire, No. 8 galvanised, 35s., and black 32s. 6d. per 100 lb. coil.; fencing standards, 12, 14, and 16 lb., at 27s. 6d., 30s. and 32s. 6d. respectively per dozen; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb.; steel plates, £34 to £36. Cast steel is £50 per ton; mild steel, £19 per ton.

The second-hand machinery market is still very firm; some fairly big orders have been placed lately for boilers and engines from the new coalfields being opened up, and prices are firm. The mines are now taking advantage more and more of buying second-hand spares to enable them to carry on. Rails have come down considerably, and large stocks are in the market; prices range from £15 to £18 a ton; new rails, £20 to £22 a ton. Steel plates have also receded, and have been sold for less than £12 10s. This price compares with £40 to £70 per ton ruling in 1916. Wire ropes are easier; large shipments are coming forward, which are being purchased, comparatively speaking, at a price at which they were going second-hand during the War. The second-hand machinery market is well stocked, and the coastal and inland towns all send here for their requirements. The second-hand iron and timber yards are fuller of stocks than of orders. Iron is selling at 6d.; timber at 10d.; casements, 9s. to 25s.; mouldings, from 2½d.

There are signs of revival in the tinplate industry in South Wales, several works are restarting and absorbing an increasing number of workmen.

For textile machinery there is an increasing demand.

It is gratifying to note that British firms, according to the latest Belgian reports, are paramount in the Katanga market against severe foreign competition.

Timber and Building Materials.

Business is very slack, and until the wages question is settled no forward movement is looked for. Stocks of timber are abundant, and supplies are coming from the Baltic regularly, but no indications are at present forthcoming as to future prices. We have, however, indicated that no lower prices in regard to timber may be expected for some time to come. Quotations:—3 by 9 deals are 1s. 2½d. to 1s. 3d.; scantlings, 1s. 2d.; beaver board, 5d.; Oregon, 9s.; pitch pine, 9s. to 9s. 6d.; floorings, 7½d. to 7¾d.; ceilings, 5¼d. to 5½d.; corrugated iron, 24 gauge, 9½d. to 10d. Furniture timber: Burmah teak, 20s.; American oak, 1in. to 3in., 1s. 6d. per super; American black walnut, 1in. to 4in., 1s. 6d. per super; West African mahogany, 1in. and upwards, 2s. to 2s. 3d. per super; 3-ply ash, 5mm., 10d. per super. Bricks remain unchanged at from 70s. for blue stock, 60s. for mixed, £4 10s. to £5 for wire cuts, and £5 for pressed per 1,000 at yards; white lime, 7s.; unslaked, 7s. 6d.; building lime, 4s. 3d.; plaster lime, 5s. 3d.; cement, 11s. 6d. a bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 47s.; 3-ply, 55s. 3d.

Builders' Wages.

The Building Trade Unions have decided against a reversion to the 48-hour week, and insist for a 44-hour week, with a counter-proposal of a 40-hour week—a five-day week of eight hours per day—at the existing rate of pay. They decline further reductions to painters and others of 5d. less per hour. Discussions are still being held.

Electrical Goods.

There have as yet been no material reductions in prices, but the tendency is towards lower levels. Switches have receded from about 21s. to 18s. 6d.—19s. wholesale; other lines remain much about the same. Dealers report a total absence of activity both locally and outside.

Oil.

The report of Dr. Wagner on his recent visit to the deep borehole in the Carnarvon district is unfavourable.

In Staffordshire, at Hardshoft, boring has been continued to a depth of nearly 4,000 feet, and, roughly, 215,000 gallons of high-grade oil has been produced.

The House of Commons has exempted from duty imported spirits produced in the Empire for the purpose of making power or industrial methylated spirits. This concession should help the motor industry and tend towards the production of motor spirit to compete with petrol.

Petroleum has, it is reported, been discovered in the Hinsum Mountains, in Northern Manchuria. Machinery and American experts are being engaged to exploit the scheme.

Railway Earnings.

South African Railways earnings for the week ended July 9, 1921, show £393,088, as against £415,044 for the corresponding week in 1920. The total revenue to date from April 1 this year is £5,940,307, as compared with £5,960,736 last year. The harbour earnings for the week ended July 9 were £17,465, as against £29,480 for the corresponding week last year.

British Industries.

Messrs. Harrison & Baynes, after a tour in Australia and Canada in connection with British industries, report that trade was very depressed owing to large stocks, financial stringency and American competition. They advocated a more active and up-to-date policy in regard to British propaganda, and the necessity of giving the Dominions exactly what they want at prices lower than those charged by foreign countries.

Working Hours in Britain.

Hard on the heels of the coal settlement it is noteworthy to report that the cotton spinners have decided to increase their hours from 24 to 35 per week. At the same time it is satisfactory to record that the labouring unemployed is gradually decreasing, a difference of more than 50,000 being recorded during the past week.

Exports Credits Scheme.

The House of Commons has passed the Bill extending the exports credits scheme to the whole of the British Empire. £26,000,000 has been set apart for the scheme, and the British Government is guaranteeing drafts drawn against shipments of goods.

German Trade Revival.

Berlin reports a big German trade revival, asserting that Britain is undercut in all markets, and that Herr Hugo Stinnes controls a capital of 500 millions sterling.

Coal.

London reports that household coal has been increased by from 2s. to 4s. per ton.

America's Wooden Fleet.

This has, it is reported, resulted in a loss of 800 million pounds.

Metal Market.

Latest quotations:—Standard copper, £70 11s. 3d. cash and £70 18s. 9d. forward; electrolytic copper, £74 10s. cash and £75 10s. forward; Straits tin, £164 15s. cash and £167 forward; English lead, £23 7s. 6d. cash and £23 5s. forward; bar silver, 37⅜d. per ounce, and fine gold 113s. 9d. per ounce. The market has ruled quiet during the past week. Copper especially was dull. Tin has declined on lesser demand. Lead, on the other hand, was in better demand at a slightly enhanced value.

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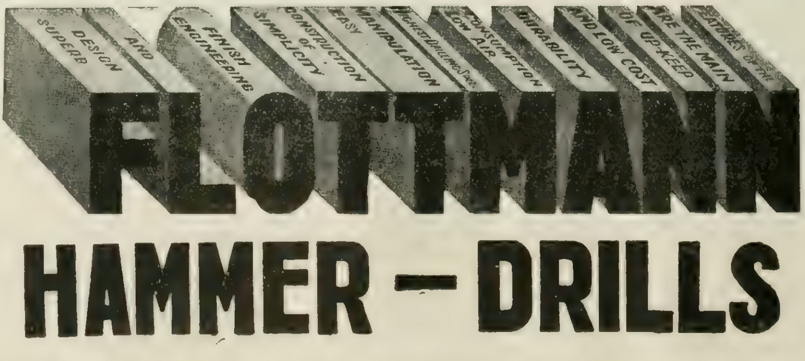

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“A FAR WEST RAND” IN THIS ISSUE.

The South African
Mining & Engineering Journal
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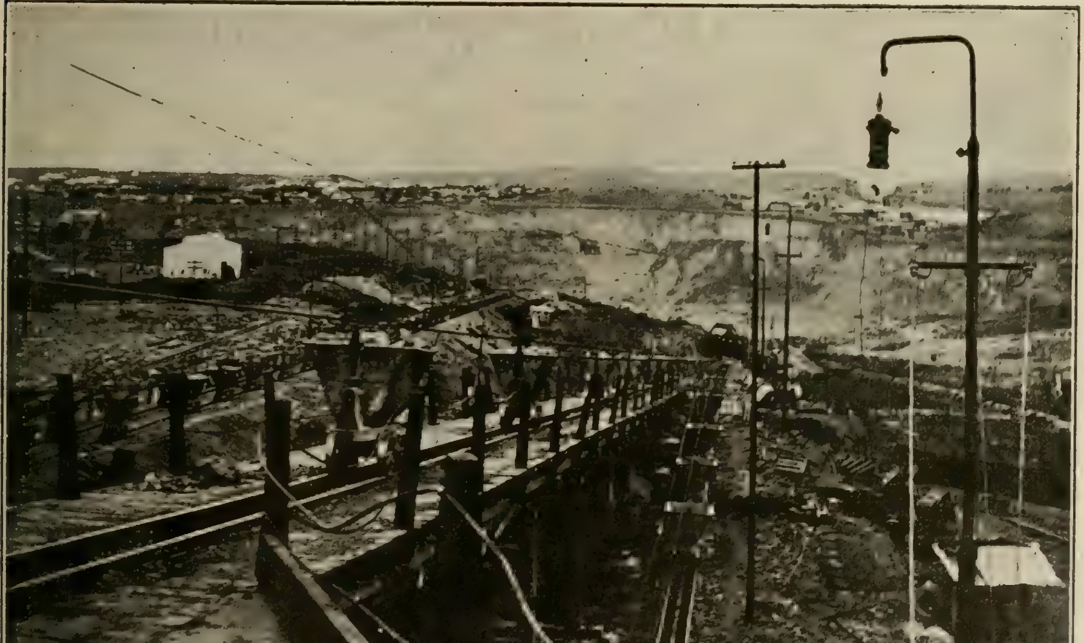
Established 1891.

Vol. XXXII., Part I.   JOHANNESBURG, TRANSVAAL, SATURDAY, JULY 30, 1921.   No. 1557.

A NEW PHOTO OF THE PREMIER DIAMOND MINE.



As stated in recent issues of this journal, the diamond mining industry is showing unmistakable signs of recovery. Elsewhere in this issue we give a statement of the output of diamonds in South Africa for the first half of the current year. The figures exhibit a big decline in production by comparison with last year's results, but a fairly early improvement in the diamond market, in which the great Premier Mine will largely participate, is looked for.

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Luipaardsvlei No. 10.

BORING OPERATIONS ON THE SOUTH-WEST RAND—WHAT THE DRILL ENCOUNTERED—CORONATION SYNDICATE'S ENTERPRISE—THE IMPROVING OUTLOOK FOR THE "CINDERELLA" SECTION OF THE REEF—IS THERE TO BE A FAR WEST RAND REVIVAL?—A COMMENDABLE EFFORT—THE DOG-IN-THE-MANGER POLICY AND THE BIG HOUSES—INSPIRED PESSIMISM—THE OLD INFLUENCES ALREADY AT WORK.

In the rather lugubrious atmosphere which at present prevails, the silver lining to our clouds is to be found on the West Rand. By comparison with the Central, East and Far East Rand the amount of development work that has been undertaken on the West, the gold that has been won therefrom, and the profits which have been earned, the area lying to the west of Roodepoort have so far cut very little ice.

Why Not a Far West Rand?

A question which, however, is considerably exercising people's minds at the present moment, and one with which Mr. W. P. Taylor concerns himself in this issue, is this: Are we to witness the development of a Far West Rand within the next few years, just as we have seen the Far East Rand area which a dozen years ago was considered to be a region of nebulous possibilities rise to heights of extraordinary prosperity during the period of the Great War? Present indications point to at least a reasonable likelihood of such a consummation in the future. Development work at Randfontein has disclosed distinctly better results during the past few months, and the day is not far distant when that great proposition will be producing gold on a much larger scale than it has done so far. Moreover, there are vast areas lying to the south and south-west of Randfontein which are known to be auriferous and in some localities payable. During the past few years these sections of the Witwatersrand have sunk into industrial oblivion, but the gold is undoubtedly there, and we foresee in the not far distant future a new chain of mines extending southwards and westwards from Randfontein—the Far West Rand of the coming years which may well enthuse new life into the whole Transvaal gold mining industry. In this view we are greatly encouraged by the results of recent borings on the farm Luipaardsvlei No. 10.

The Drill on Luipaardsvlei No. 10.

The Coronation People's Enterprise.

About twelve months ago the Coronation Syndicate, which had acquired options over the farm Luipaardsvlei No. 10, which lies to the South of Randfontein, commenced boring operations on this property. It was a plucky effort, and the reward with which the drill has met is fully and richly deserved. Seventeen boreholes had been put down in this locality by former seekers of a continuation of the Randfontein series, and the results secured were not considered to be sufficiently attractive to warrant the continuation of further operations. There are sound reasons for believing that these boreholes were not wisely located.

The facts are that Luipaardsvlei No. 10 lay fallow for years, and it was not until the middle of last year that any further practical attempt was made further to unravel the riddle of South-West Rand stratigraphy.

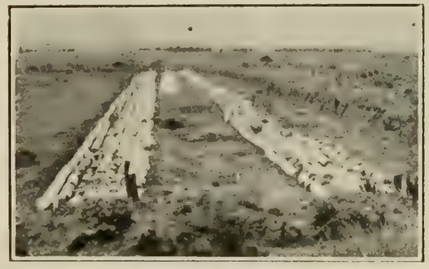
A Borehole Located.

But about twelve months ago Messrs. J. M. Calderwood and J. A. Thorburn located a drill hole on the farm. The first boring was not successful. The drill was then shifted, and a week or two ago it encountered pebble beds.

What the Drill Encountered.

Last week the borehole was completed, and the following official cablegram has been despatched to London with reference to the operations:—

"Full borehole section completed down to underlying shale, total depth 1,180 feet. Reef intersected at 770 feet now correlated as Randfontein West Reef series, which is the other pay reef mined at Randfontein. Section shows two pebble reefs, four inches, eight inches thick, containing low values; but lower section contains thin pyritic pebble band assaying six hundred and sixty-seven pennyweights of gold per ton, equivalent to 10½ dwts. per ton over stoping width of 48 inches. Locating another borehole immediately, which should intersect both leader and west reef about same depth."



Sections of Core from the Luipaardsvlei Borehole.

Starting Another Hole.

The technical advisors of the company, after a careful examination of the cores, are of the opinion that the borehole did not encounter the leader. Another borehole is, however, now being located 500 feet on the dip of the strata from the drill which has just been sunk, and the results of this further boring will be awaited with the very greatest interest.

A Link in the Broken Chain.

These enterprising drillings, taken in conjunction with the good developments which are being secured in depth at Randfontein and considered in relation to the borehole data secured by the Western Rand Estates some years ago, encourage one in the hope that we may yet see a big and prosperous annexe of the Western Witwatersrand.

The Pullinger Borings.

With reference to Western Rand Estates, popularly known as Pullingers, an official summary of what the boreholes showed is given herewith. It will be noted that as with the Randfontein group of companies, so in this Western Rand proposition there is evidence of the existence of a double reef—what is termed the Randfontein Leader and the West Reef. With this explanation the following official schedule of boreholes will be better understood:—

	Western Rand Leader.			No. 2, West Reef.		
Boreholes.	Depth. Feet.	Width. Inches.	Values. Dwt.	Depth. Feet.	Width. Inches.	Volues. Dwt.
No. 2	—	—	—	2,415	29.0	5.20
No. 4	1,972	10.5	158.00	2,473	9.0	6.58
No. 5	—	—	—	2,393	15.5	2.51
No. 7	—	—	—	3,188	9.0	22.74
No. 8	1,677	15.5	18.83	2,004	15.0	6.00
				3,190	15.5	4.00
No. 9	2,302	8.0	6.60	3,227	5.0	12.75
				3,229	7.5	11.23

It will be clear from the foregoing that the evidence of these boreholes pointed to the existence of a rich reef underlying the dolomites, and although boreholes cannot be regarded as giving very reliable information as to reef widths and values, it must be admitted that there are reasons for believing that the "Pullinger" properties possess very considerable productive and profit-earning potentialities.

The Dolomites.

A shaft was subsequently sunk on Gemsbokfontein, but operations were suspended in February, 1911, when the shaft had reached a depth of 97 feet, owing to exhaustion of working capital. This shaft met with considerable difficulties in connection with water, sinking having to be conducted through aqueous dolomite measures. In connection with this aspect of the proposition it should, however, be borne in mind that these water difficulties are not likely to be encountered in depth.

Locating the Borehole Site. Mr. Calderwood and Mr. Thorburn studying the map (Mr. Alexander on the right).

It should also be borne in mind that the adoption of the cementation or Francois process at Daggafontein and elsewhere on the Far East Rand has been attended with most satisfactory results, and there can be no doubt that there are no shaft sinking obstacles which cannot now be overcome at Gemsbokfontein.

Although too much importance cannot be attached to the evidence of isolated boreholes, it can at least be said that the borings on Luipaardsvlei No. 10 constitute a valuable and encouraging work in the broken chain of evidence between Randfontein and Gemsbokfontein. Moreover, we think that it can be claimed that the evidence which is obtainable on the West Rand to-day in regard to an expanding gold field is at least as encouraging as were prospects on the Far East Rand seventeen or eighteen years ago.

A Word of Commendation.

We congratulate Mr. Graumann and his associates of the Coronation Syndicate on the preliminary results of his courageous dive into the unknown depths of Luipaardsvlei No. 10, and we wish them all success in their further efforts to prove a large and valued extension of our gold field.

At a time like the present, when we are constantly being given gloomy pictures of grass growing in our streets, it is encouraging to find some men who have the courage and the enterprise to embark on a venture which may quite possibly help to materially lengthen the life of our gold mines and substantially improve the present unsatisfactory industrial position on the Witwatersrand.

Enterprise and the Big Houses.

And our congratulations and wishes for success are none the less sincere because the prime movers in this enterprise are not within the portals of the Big Controlling Mining Houses. No doubt it was a piece of sheer impertinence for Mr. Graumann and his colleagues to venture into the sanctified and idle domains of the big interests.

We can quite imagine their stern disapproval of this attempt to break through the ring fence which has been erected by absent millionaires around the Rand. We can quite understand their indignation at anybody endeavouring to prove a payable proposition in an area which has been condemned by them to everlasting dormancy.

Inspired Pessimism.

And for these reasons it is not perhaps surprising to find that paragraphs have been appearing in the Press which warn the public against "building upon the reports that circulate from time to time as development proceeds."

It is undoubtedly wise to be cautious in one's utterances in regard to new mining ventures. We quite agree, for instance, with the cautious man who considers that a little too much was said about the Modderfontein East a few months ago. But, on the other hand, we do not altogether endorse the pessimism of "A Mining Authority," who, when interviewed on the subject of the Luipaardsvlei borings, remarked: "You may remember how rosy things looked with regard to the Pullinger boring in this region and how disastrously they ended owing to the insurmountable difficulties experienced from water flooding."

Mr. Harry Graumann and Mr. Alexander on the farm Luipaardsvlei.

So far as we know, there is no evidence to support the innuendo that a mining proposition on Luipaardsvlei No. 10 is doomed to failure because of water difficulties. On the contrary, the borehole just completed went through strata of a notably non-aqueous nature.

There is, too, a well-known and proven method of sinking through watery strata known as the cementation process which has been eminently successful at Daggafontein, and which can be successfully applied at Gemsbokfontein or Luipaardsvlei No. 10 or anywhere else for that matter if necessary.

And, therefore, whilst we are not prepared to make any assertion to the effect that the richness of the Far West Rand will not be fully appreciated until crushing is commenced at Luipaardsvlei No. 10, or any similar unduly optimistic statement, we would protest strongly against the employment of any subtle methods which are designed to sacrifice enterprise in the interests of the dog in the manger policy which has for so long been the greatest curse of South Africa.

The Far West Rand.

A NOTE BY A TECHNICAL CONTRIBUTOR.

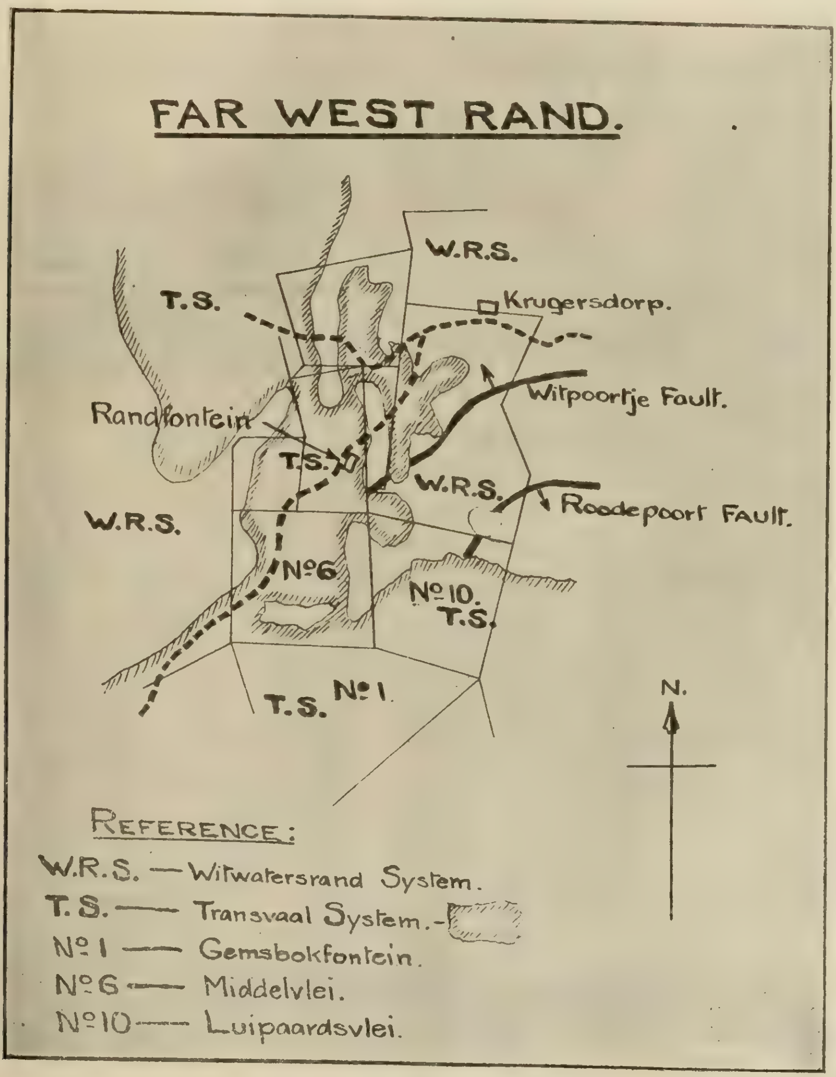
The land surface in the Far West Rand area is made up chiefly of rocks of the Witwatersrand system, and of the lower measures of the Transvaal system. The accompanying diagram represents the geological formation. The areas marked T.S. are remnants of the Transvaal system and represent chiefly rocks of the Dolomite and Black Reef series. The areas marked W.R.S. represent rocks belonging to the Witwatersrand formation.

The Transvaal system has been deposited unconformably on steeply dipping beds of the Witwatersrand system, and in this locality denudation has continued to such an extent that only a comparatively thin capping of the younger formation exists. However, as one proceeds westwards, the Witwatersrand system becomes completely covered by the Transvaal system until one reaches the Klerksdorp district, where the Witwatersrand rocks are again seen to outcrop. They also outcrop to the south in the neighbourhood of Parys, thus leaving very little doubt as to their continuity beneath the rocks of the Transvaal system. However, absolute proof of this fact can only be obtained from the results of boreholes put down in the intermediate spaces, as it may be argued that the younger formation could have been deposited on an ancient land surface from which the Witwatersrand rocks have been completely removed.

Proof of this nature has already been obtained in certain parts of the Far West Rand. Several boreholes put down on the farm Gemsbokfontein No. 1 have proved that the Witwatersrand beds with their accompanying gold bearing reefs are to be found. In one of the boreholes the following beds were traversed:

Dolomite, 0—1,230 feet.
Diabase, 1,230—1,706 feet.
Witwatersrand reefs, 1,706—2,009 feet.

Further corroborative evidence has recently been obtained at Luipaardsvlei No. 10. A feature which must not be lost sight of in considering the geology of the Far West Rand is that natural dislocation known as the Witpoortje Break. The extent to which this has effected the gold bearing reefs of the West Rand is well known to most mining men. Here natural agencies have forced up between the Witpoortje and Roodepoort faults a large area of barren soil composed of rocks of the lower half of the Witwatersrand system. As can be seen from the diagram, both these faults are covered by the superimposed beds of the Transvaal system towards their south-western extension, hence one is justified in assuming that the effects of faulting are carried with them. How far and in which direction these effects extend can only be determined by means of boreholes, and a very close study and correlation of the strata passed through in these bores.



A Geological Section of the West Rand.

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Why Not a Far West Rand?

[By **W. P. Taylor.**]

In this brief contribution, based on the recent good developments on the West Rand, Mr. Taylor voices a moderately-worded plea for increased attention to the extension of the Rand in that direction and for working now dormant mines between Randfontein and Klerksdorp. Mr. Taylor is a director of Machavie and other properties in the district, and he therefore speaks with knowledge and authority.

When I introduced the subject of overlying or underlying reefs I did so purely with the view of constructive action aiding to realise something that I thought imperative at the present moment. I thought that it was necessary to know more than geological theories about a belt possibly ten miles wide of auriferous strata that had so far only had a single line of reefs worked on it, whilst there were so many more that undoubtedly carry gold, but which have had little done to prove their continuous lines. I am glad to see that the Randfontein Company is about to work the Horsham and Monitor reefs on their overlying eastern strata, on a very large scale. The West Rand Consolidated has worked these reefs for years, and there is perhaps a possibility that, in time this line may be worked in other parts. For years the Lancaster West worked a line that is probably the same series, but conditions caused them to abandon their mines and liquidate. But the low values on the Main Reef in places shows poorer results, and therefore their failure does not mean general discouragement of the whole line of the reef. Recently, the Coronation Syndicate put down a borehole on Luipaardsvlei, and the assay results appear to be very similar to the No. 4 borehole of the Western Rand Estates on Gemsbokfontein. Singularly, this Coronation borehole confirms the late Mr. J. S. Curtis's effort to find this reef, for he put down a borehole there many years ago and just missed it through a fault. This borehole and the No. 4 borehole at Gemsbokfontein indicate a long line of reef running from east to west, and the formation continues unbroken for perhaps fifty miles or more. There is therefore reason to regard these boreholes as keys to a solution that might solve many of our troubles. It is unfortunate that although gold is perhaps the only one thing that one can bank on to-day, the moment is too unopportune to get attention to this great tract's development. For I understand that although Europe was tried for capital for the purpose, it was from America that the assistance was nearly obtained, and it is a matter of deep regret, from a general point of view, that matters were not arranged and the work carried out. There are payable mines in the Potchefstroom district lying idle. One of them, the Machavie, has estimated gold contents running into many millions. It has 10 per cent. clean pyrites in its ore, and there is a great demand for the pyrites. The Afrikander has payable ore reserves, but it also has a body of undecided holders. They all seem waiting for one another to die instead of working their mine; in fact two of its principal shareholders have died already and some of its smaller shareholders, I believe, are almost torpid from the long weary wait of some fifteen years of inactivity. The Machavie has only been closed down three years, but its possibilities lead me to think it will not remain dead as long as its sister mine, though a very large shareholder in it recently bid me to prepare for an unlimited delay before it would restart. That sounded like another death knell, but I am not going to take it; I am going to use my energies to get every payable gold mine worked that can possibly be worked; to get interest aroused in such discoveries as the Coronation and Western Rand Estates; in any payable overlying or underlying strata; for I feel that by so doing men's minds will become directed to the necessity of providing mines for those that are now so rapidly being worked out. If this is not done, these possibilities will lie dormant until the reaction against this studied inactivity will result in misery and turbulence. Well, there is the great possibility of a Far West Rand, with promise of industrial expansion. There is possibly a hundred miles of gold and here is a fast waning industry. Might I respectfully direct the attention of the Minister of Mines to these facts? I know there is no law to compel mines to be worked, but if the interests of the country are being held up by mine-owners' inaction, let us have a law at once to remedy the evil. Let no payable mine be locked up for 15 years, and whilst this is being done the question of minerals all over the Union merits attention. The landowner should not lock up minerals any more than the mine-owner.

I do not suggest robbing landowners, but why not have compensation arranged in such a form that the present restricted condition can be overcome. And as I advocated in a previous article—compensate the finder. Don't make a man pay to search for gold; compensate him if he finds a new gold field. Humanity are like sheep—without a lead they seem to huddle all over the field. No one, to-day, seems to desire to give a lead; but when companies are floated and the shares rise to high values, market rises give such confidence that capital can be found for what to-day is quite impossible.

W. P. TAYLOR.

The Knights Deep Plant.

WISDOM OF DISPOSAL TO A MACHINERY SYNDICATE QUESTIONED.

WHAT THE EQUIPMENT COST AND WHAT HAS BEEN REALISED FOR IT—MINING COMPANIES URGED TO SELL PLANT BY PUBLIC AUCTION OR TO CALL FOR TENDERS.

In the following article we deal with the disposal of the equipment of mines which have gone into liquidation, and urge that instead of selling to machinery syndicates such as recently has been done, tenders should be called for or that the assets should be sold by public auction. We here deal with the concrete case of the Knights Deep, and in connection ,with the transactions of this Company we wish to make it quite clear that there is no suggestion of dishonesty on the part of any person or persons connected either with the Company or with the purchasing syndicate. We feel sure that the Company acted in a fair and square and straightforward manner, and did what it considered to be in the best interests of its shareholders. But we very much doubt if this line of action was wise. We consider that the Company committed an error of judgment and could have obtained more for the plant had the sale been negotiated in a different manner.

The strictures which have been passed by this journal during recent months upon the non-technical administration of certain of the " groups " which control or are supposed to control important mining ventures on the Witwatersrand, have very naturally received condemnation in certain interested quarters both here and in London. But on the other hand we have received many congratulatory messages, both written and verbal, from independent shareholders and disinterested parties in South Africa and Europe, upon the new and critical policy upon which this paper has embarked, and it will be our well-considered policy to continue without fear or favour to endeavour to represent to the public generally and to the overseas shareholders in particular the position of the mining industry, and faithfully to chronicle what we consider to be shortcomings and mistakes on the part of those responsible for the direction of our various mines.

How Second-hand Machinery Has Improved in Value.

A matter which seems to call for special investigation at this juncture, and one which curiously enough has receievd little ventilation either in the Press or in the Board Room, is the recent disposal of machinery by mining companies to syndicates and private individuals without recourse to the usual methods of calling for tenders or of selling the plant by public auction.

Within the past year or two several large propositions on the Witwatersrand have, through exhaustion of ore contents or because of inability to withstand the crushing burdens of high costs or else because of some exceedingly calamitous happening such as occurred at the Knights Deep last September, been compelled to cease operations or to go into liquidation. They have accordingly disposed of their assets, and obviously the most valuable of these has been their plant. Machinery purchased and erected in the pre-war days has during the past year or two realised very good prices on account of the difficulty of obtaining new plant from Europe and America. Indeed it may be said that to a very large degree the influence of high costs of production in, and diminished output from, overseas factories have counteracted the factor of depreciation in respect of such machinery to such an extent that equipment put in several years ago now finds buyers at figures approximating to the original cost.

The Case of the Knights Deep.

In this particular instance we are concerned mainly with the Knights Deep. This company was registered in September, 1895, and commenced crushing in August, 1903. At its outset the mine had a highly successful career. Substantial dividends were paid, and at one time the shares were dealt in at over £4. Not long afterwards it was, however, discovered that the Knights Deep was after all a low-grade proposition, and for some years previously to its exit from the list of producers it was struggling against adversity. The incidence of the gold premium, of course, afforded the company a considerable measure of relief. But despite this Knights Deep shares were quoted at about 4s. 6d. buyers in the early part of September last. The next event in the history of the company was a most calamitous fire which occurred on September 17th. According to the Superintending Engineer's report, the fire broke out in the mill engine room at the mine, and rapidly spreading from that point resulted in the complete destruction of the stamp mill. The probable cause of the fire was the fracture of the main shaft of the mill engine, allowing the fly-wheel to tilt over and run against the edge of the pit. The heat thus generated by friction may have ignited the oil drippings at this point. So disastrous to the fortunes of the company was this conflagration that the shares had advanced to ten shillings by the end of the year upon the excellent liquidation prospects of the company.

What the Knights Deep Plant Cost.

The expenditure at the Knights Deep property to July 31st, 1920, on equipment, less amounts written off, is stated in the balance sheet at 31st July, 1920, to have been £1,208,838. This, according to the balance sheet, was made up as follows:—

Shaft Sinking	£310,919	18	9
Surface Plant	235,830	2	6
Underground Plant	154,416	9	1
Workshops and General Buildings ...	111,943	9	2
Ore Reduction Plant	377,662	4	8
Roads and Surface Improvements ...	3,027	7	6
Water Purification Installation ...	2,084	9	5
Water Disposal Plant	460	10	9
Water Cooling Arrangements	889	14	7
Sand Filling Plant	11,604	2	4
	£1,208,838	8	9

From this may be deleted the sum expended on shaft sinking, viz., £310,920, inasmuch as such expenditure has no, or very little, recoverable value.

The mill and mill engine-house were, as already stated, completely destroyed by fire on September 17th. The value of these assets appears in the analysis of capital and extraordinary expenditure at 31st July, as attached to the last balance sheet issued by the company, to be made up as to

Milling Plant	£84,251	6	0
Power	28,654	9	11
Boiler	15,791	9	1
	128,697	5	0
Plus expenditure on shafts	310,919	18	9
	£439,617	3	7
This amount of	£439,617	3	7
Deducted from total Expenditure on Equipment as per balance sheet of	1,208,838	8	9
Leaves the sum of	£769,221	5	2

—And What it Realised.

At the extraordinary general meeting of shareholders held on February 10th of this year Mr. D. Christopherson stated that the company had realised in the way of other assets such as sales of stores, plant and equipment, £66,400. It has since been ascertained that the majority of the Knights Deep equipment has been sold to a concern known as the Knights Deep Machinery Syndicate. We do not know what exact amount the Knights Deep Machinery Syndicate paid for that portion of the plant which they acquired. We believe that some portions of the equipment were sold to other purchasers. But we have it on the authority of the Chairman of the Company that since the 17th September (and up to February 10th) the company had realised in the way of sales of stores, plant and equipment, £66,400, and one is entitled to presume that this sum represented the greater part of the amount payable by the Knights Deep Machinery Syndicate for the bulk of the equipment of the mine, which as shown above had a book value of three-quarters of a million. No tenders for purchase of the equipment were advertised by the company. The transaction was not effected by means of a public auction. We observe that the Machinery Syndicate is, however, adhering to usual procedure, and in our last week's issue the Machinery Syndicate advertised for sale a large amount of plant.

The Operations of the Machinery Syndicate.

We are not aware of the exact amount of equipment that has to date been sold by the Machinery Syndicate, nor are we certain of the prices secured for this valuable assortment of mining machinery and buildings, etc., for which the shareholders of the Knights Deep paid the handsome price of three-quarters of a million. But we are quite sure of this, that if the Machinery Syndicate has not already netted a very substantial profit out of this transaction, it will assuredly do so before its books are closed. It seems to us that in this case any defence of its action which the company may put forward on the grounds that (a) the Machinery Syndicate is more competent to deal with a business of this kind than an unfortunate gold mining company; (b) that a sale by auction or by means of tenders might

The Knights Deep Plant as it was before the Fire.

have been unsuccessful on account of the possibility of a ring being formed amongst machinery dealers against the company; and (c) that the company saved money by effecting a quick and outright sale, would be a very weak defence indeed.

No fairly close student of Rand mining administration will be prepared to deny that during the past few years there has been a deplorable depreciation in ordinary business acumen amongst the administrators of our mining houses. We will not therefore debate the question of comparative competencies as between Mining Houses and the Machinery Syndicate. But surely it would be a humiliating admission for a once powerful and wealthy mining corporation to state that it feared a possible combination of dealers in second-hand machinery! As to the third point, even if it did cost more and take longer to sell the material direct to actual users (such as, for instance, new Natal collieries, which have recently been purchasing Rand machinery on a large scale), it would be profitable to the company if it got substantially more for its assets.

Other Cases.

The Knights Deep is not the only company which has disposed of its equipment assets without calling for tenders or selling by public auction. Other mines which recently have gone into liquidation have not deemed it expedient to advertise sales of plant, and we propose to devote a certain amount of attention to these other concerns at a later date. In the meantime we would urge upon the controllers of the mining industry that these methods of disposing of shareholders' assets to machinery syndicates and private buyers must cease. Mining companies which in future have plant to sell will be well advised to call for tenders from prospective purchasers or else resort to a public sale by auction.

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Transvaal Tin Fields.

THE OUTLOOK AT LEEUWPOORT.

MUTUE FIDES MINE TAKEN OVER ON TRIBUTE—A VALUABLE MEMOIR BY DR. WAGNER.

We dealt at some length in our last issue with the prospects of the Transvaal Tin Mines, and this week we are able to supplement these remarks with a few notes on the present position at one or two properties, together with some new photographs and extracts from a valuable memoir on the Mutue Fides-Stavoren Tin Fields by Dr. Wagner.

At Leeuwpoort, which, needless to state, is one of the most important tin mines of the Southern Hemisphere, the management is marking time, but is confident that in the near future the price of the metal must improve, and that when it does the Leeuwpoort Company will fully participate in the revival.

With regard to the Mutue Fides Mine, we understand that Mr. Charles Russel, of Johannesburg, has recently taken over this proposition on tribute.

The following extract from Memoir No. 16 of the Geological Survey of the Union of South Africa, by Dr. P. A. Wagner, on the Mutue Fides-Stavoren Tin Field, which has just been issued, is of special interest in this connection.

The name " Olifants River Tin Fields " is applied rather vaguely to a considerable tract of country traversed by the Olifants River in the Waterberg, Middelberg and Pietersburg Districts. The fields include among others the farms Mutue Fides, No. 1844, and Stavoren, No. 1871. The most important mineral deposits which include occurrences of tin, copper and tungsten ore, are to be found on these farms. The first systematic prospecting was conducted in this area shortly after the Anglo-Boer War. The metal sought was copper and found only in small and unpayable quantity. Operations were soon abandoned. In 1912 alluvial cassiterite was found near the Olifants River in the bed of a watercourse which drained the farms Stavoren and Gaasterland. Following up this occurrence led to the discovery of tin deposits on the farms Mutue Fides, Gaasterland and Roodewal.

The country in this neighbourhood is very poorly supplied with water. The Olifants River, which even during the dry season is a fairly strong river, is so low lying that its waters can only be utilised by pumping.

Geology.

Much the greater part of the area is taken up by rocks belonging to the Bushveld Igneous Complex and the lower division of the Waterberg System. Quartzites and altered shales belonging to the Transvaal System are also to be found.

The geological structure is comparatively simple. The rocks of the Bushveld Igneous Complex here represented by granites and granophyres form part of a great laccolith which has intruded between the Transvaal and Waterberg Systems. The mineral products of the area are cassiteriti, scheelite, copper ore, molybdenite and white arsenic, the aggregate value of the output being over £190,000. All the deposits so far located are confined to a rather indefinite zone extending in an S.S.E.-N.N.W. direction. They are not restricted to any definite horizon or formation occurring in the granite, but are found in all the rocks between the granite and the basal quartzites of the Waterberg System. The occurrences are very numerous and varied, and it is difficult to arrive at a satisfactory basis of classification. The deposits in the granite are essentially tin deposits, cassiterite being the only mineral recovered. As the deposits extend towards the contact of the granite and Waterberg rocks, an influx of several other minerals is met, including scheelite, chalcopyrite and wolframite.

The ore-content of the deposits is extremely erratic, and in consequence difficult and expensive to work.

The Leeuwpoort Tin Mine.

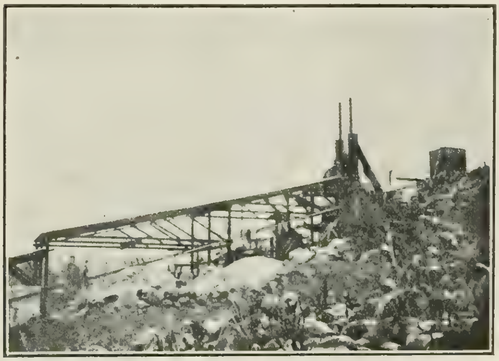
Mining.

The erratic nature of the ore deposits has rendered it impossible to lay down a definite scheme of development, and it is a question of following or trying to follow the ore—in the majority of cases by no means an easy matter. In some cases where the ore occurs in regularly tabular form, stoping is conducted on ordinary lines. Where, however, as is more generally the case, the deposit consists of a succession of irregular ore bodies or of a tortuous pipe, the workings are apt more closely to resemble great burrows than anything else. The smaller workings are all equipped with hand windlasses, and the larger ones with ox hoists or small steam winders.

Ore Treatment.

In the matter of ore treatment each group of deposits presents its own specific problems. The occurrences in the granite are best off in this respect, as they are essentially tin deposits, although even here the presence of pyrite and arsenopyrite necessitates roasting and magnetic separation.

The ore treatment at the Mutue Fides is as follows:—Mined ore is hand-picked. Waste to dump. Hand-sorted crushed to —1½ in. Passed through 1 in. mesh trommel. Oversize passed through rolls set to ¼ in. and joins undersize on way to 5 ft. Huntington mill with ¼ in. screen. Pulp from mill to elevator, then 300 mesh trommel, where oversize goes to 3-compartment Harz jig, which gives a 35 per cent. tin concentrate. The second compartment yields pyrite' which is discarded, and third compartment a middling product which is recrushed in the Huntington mill. The undersize from the trommel goes to a classifier, from which the underflow goes to a Wilfley table and the overflow to a fruevanner. The concentrate from the vanner is reconcentrated on a convex buddle. The concentrates from the Harz jig, Wilfley table, and convex buddle all go to a calcining furnace, where they are given a quick roast, which renders the pyrite and arsenopyrite present sufficiently magnetic to be removed in the separator. The roasted product on cooling goes to a Woodworth Tregaskis magnetic separator. This removes the oxidised pyrite and aresenopyrite, leaving a non-magnetic concentrate which, according to the quantity on hand, is either sieved or put over a spare Wilfley table, and is then dried and bagged. The concentrate averages 73 per cent. metallic tin.



View of the Treatment Plant on Stavoren No. 1871.

View of the Battery of the Mutue Fides (T.C.L.) Tin Mine.

Native Labour Underground.

A misunderstanding has arisen between the Chamber of Mines and the Mine Workers' Union in regard to the utilization of native labour underground to the best advantage. In the letter of the Chamber of Mines of June 28 to the S.A.I.F. it was stated that the proposed amendments to the Mining Regulations drafted by a sub-committee of the Chamber and of the Mine Workers' Union with a view to the better utilisation of the time spent underground by natives, were turned down by the union. The correctness of this statement was recently challenged by Mr. W. Price, secretary of the Department of Mining Industry. The Chamber in reply states that the facts are as follows: On October 2, 1920, the Chamber received from the union a letter signed by Mr. E. S. Hendrikz plainly stating that the general council of the Mine Workers' Union had "turned down" the proposed amendments. The Chamber adds that that letter is the last which it received from the union on the subject. Mr. Price now states that on May 7 of this year the union wrote to the Minister of Mines accepting the amendments. The Chamber has no knowledge of what may have passed between the union and the Minister or any other third party; but no information to the effect that the union had withdrawn from the position indicated in the letter above set out was communicated to the Chamber either by the union or by the Minister. At the conference held between the Chamber and the Federation on the 5th instant, the Chamber's representatives again pointed out that these amendments had been rejected by the unions, and the statement was never challenged, although there were present six representatives of the Mine Workers' Union. The first intimation that the Chamber had of any such change in the attitude of the union was through telephonic messages received within the last few days; and these have not even now been confirmed by any official letter to the Chamber from the Mine Workers' Union. In the absence of any reply by the Union, the matter rests there for the moment.

* * * *

A Remarkable Gold Mine.

Having been formed as far back as 1830, the St. John del Rey Mining Company enjoys the distinction of being the oldest gold mining enterprise in existence. It is also noteworthy from the fact that the workings are at the greatest depth yet attained off the Rand. The mines, it may be recalled, are situated at Minas Geraes, Brazil, and are now operated by means of a hydro-electric power installation. The year ended 28th February last was marked by the attainment of an exceptionally high—if not, indeed, a record—profit from the treatment of a smaller quantity of ore than dealt with in any year since 1907. For the first-named feature the gold premium was mainly responsible; for the second, the temperatures of the workings. Irrespective of the premium, however, the yield averaged 56s. 9d. per ton, as against 53s. 7d. in 1919-20. The additional receipts on gold amounted to £126,800, increasing the revenue to £549,900.

Our Second Special Coal Number.

A BIG PRODUCTION—NEW LEWIS & MARKS COLLIERIES—THE SCHOENGEZICHT AND LARGO PITS.

The second special Coal Number of the "S.A. Mining and Engineering Journal" is now in the Press and will be on sale in the course of the next few days. The publication constitutes an exceedingly bulky volume. It is an even bigger production than our first Coal Number issued at the beginning of last year, and the work of completing the immense amount of data on every conceivable aspect of South African coal has proved a colossal task. On account of the large number of pages and the inclusion at the last moment of special articles from our London correspondent, the issue is taking longer to print than was anticipated, but it is expected to have a large number of copies ready for delivery next week. The price of the number has been fixed at five shillings. Our second Coal Number deals exhaustively with several new collieries which were either not opened up or had not attained to any position of importance at the time of the publication of the first coal issue.

Schoengezicht and Largo.

Special mention may here be made of the new Lewis and Marks' Collieries—Schoengezicht in the Witbank district and Largo on the Far East Rand. Schoengezicht has all the makings of a valuable colliery of large outputting capacity, and as to Largo a technical representative of the Journal who visited this propostion a few days ago reports as follows:—

A View of the Largo Colliery.

The colliery is situated about three miles south-east of Welgedacht Station on the Witbank line. The colliery is adjacent to the big gold-producing mines of the Far East Rand and is in the centre of a vast area of proved gold fields which still remain to be developed. Its geographical position, therefore, is such as to give it a ready command of extensive markets in the future

Capacity of 10,000 Tons per Month.

The present output of the mine is 30,000 tons per month, but its full capacity is 60,000 tons per month, at which rate the already proved area will give a life of fully thirty years.

The photographs represent two views of the surface plant. The coal from the mine after being hoisted to the surface is tipped into a jigging feeder which delivers the coal on to an endless picking belt. The waste rock is here removed from the coal and a small percentage set aside for sale as domestic coal and for use on the locomotive. The remainder is discharged at the end of the belt into a specially designed crusher, which gives a product varying from nuts downwards. The crushed product passes by means of a conveyor belt to a grading trommel, which discharges nuts into one truck and peas and duff into another.

Whole Plant Electrically Operated.

A special feature of the whole plant is that all the machinery is electrically driven, and if it were not for the locomotive used in hauling the coal from the mine to the station, and the cooking appliances in the native compound, the whole mine would be free from smoke. Another instructive feature of this mine is the absence of a waste dump. It is gratifying to note that the problem of avoiding the waste of one of our most vital sources of energy, which one usually finds associated with South African coal mines, has been so effectively solved at the Largo Colliery.

Another Scene at Largo.

These new Lewis and Marks' Collieries are dealt with in detail in the special Coal Number.

A New Lewis and Marks Colliery in the Witbank District, Schoengezicht.

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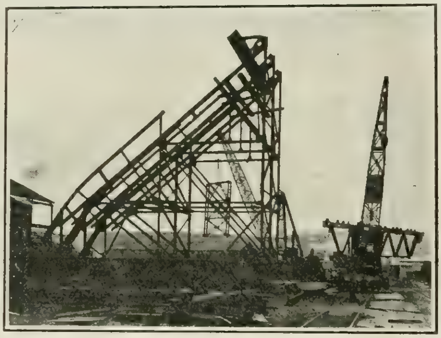

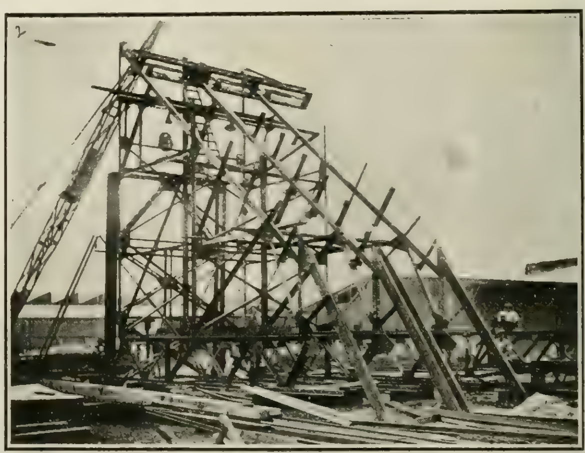

Illustrations show part of an incline gantry for the Delagoa Bay Coaling Plant, under Construction.

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Coal Costs and Competition : The Real Problem.

STARTLING ANALYSES OF THE WAGE PER TON OF COAL PRODUCED IN GREAT BRITAIN AND AMERICA.

The facts set out in the following article are of such moment to British industry and contain such an obvious lesson for South Africa that we print it in full. Wages per ton, not wages per man, it will be seen is the vital factor.

British industry can stand coal twice as dear as American industry can, because in this country we have our mines, works, and ports all close together, whereas in the United States vast distances separate the coal from the iron ore, and the furnaces from the shipping ports. But we cannot successfully compete in the markets of the world whilst our coal is anything like four times as dear as American coal. It may not be necessary to reduce our wages very much per man or per week, but our wages per ton must be drastically reduced. We require an increased tonnage per unit of labour. *Forty years ago we obtained over* 300 *tons* of coal per year, or *six tons per week, per man* employed at the mines. Now, with greatly improved appliances, lights, and ventilation, we are getting less than 200 tons a year—*less than four tons per week*—per mine worker. Industrial Britain—especially the mining industry—must decide, and decide quickly, between " ca' canny " and starvation. This is the hard fact and the plain issue.

Let us draw a comparison between British and American mining conditions. When we were getting 300 tons per head per annum the Americans were producing 400 tons. That was natural. American coal is easier to get than British coal, and, as just mentioned, we can stand coal twice as dear as our rivals can. But what is not natural is that whilst American output per man has advanced from 400 tons to 1,000 tons a year, British production has declined from 300 tons to 200 tons. Making all due allowances for different natural conditions and for the smaller number of mechanical cutters employed in this country, it is not extravagant to say that our British output per man ought to be equal to at least half the American output. With the many huge and splendidly equipped mines opened out in this country within the last twenty years, and with the great improvements made in most of the older mines, our output per man ought to be greater now than at any previous time. Yet it is more than 33 per cent. less than it was a generation ago. This is the real coal problem, and it must be tackled forthwith unless we are to perish. We cannot wait until other sources of industrial power are fully developed. The time may come when we shall manage without coal; but that time is not yet. We must have cheaper coal in the immediate future if we are to escape ruin.

Exact cost comparisons between Britain and America are difficult, but we can get near enough to the mark of accuracy for all practical purposes. Our figures for the first three months of this year show miners' wages to absorb 29s. 6¾d. per ton of coal sold. Add free or cheap coal and rent allowances for the miners, and it will be seen that in the first quarter of 1921 the *wages cost of a ton of British*

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coal at the pits was 30*s*. That was my own estimate before the official figures were available. I also wrote that the wage cost of coal production was four times as high in Britain as in America, and I have been seriously challenged to furnish proofs.

Against these official British figures I have no identically comparable American returns; but I have something very near the standard. For example, the Federal Commissioner of Labour Statistics reported that the 20,354 miners employed at the seventy-eight mines taken for statistical purposes in the United States received £294,934 in wages in two weeks in January, 1921. That was slightly less than £7 5s. per man per week. Unfortunately, the output figures are not supplied at the same time. But we can get a rough estimate.

The Mine Statistician of the United States Bureau of Mines says that the American coal output per man employed increased from 651 tons in 1901 to 1,012 tons in 1918. Possibly the rate of increase has not been quite maintained, but there is nothing to indicate that the production per man has gone back by more than a trifle, if at all. We know that the 1920 output was the best but one in the history of the American coal trade. It is a safe assumption, therefore, that the production per man is about 1,000 tons a year, 20 tons per week for fifty weeks in the year, against our British output of 200 tons a year, or 4 tons per week.

Thus it appears that whilst the American miner produces 20 tons for £7 5s., the British miner only produces 4 tons for £6. In other words, the American labour cost *is* 7*s*. 3*d*. *per ton*, whilst the British cost *is* 30*s*.

There is other evidence to the same effect. Only last year the United States Federal Trade Commission published a report based upon the returns from 541 mining companies in the three States of Maryland, Virginia and West Virginia. It was shown that for the year 1918 the costs of production varied between the districts from 1.63 dollars to 3.09 dollars per ton. The realised prices ranged from 2.45 dollars to 2.88 dollars. Of the total costs of production wages varied from 26 cents to 64 cents to the dollar. Our British wages average between 70 and 80 per cent. We use fewer machines, of course.

But the most comprehensive American figures available are those contained in returns supplied by 1,589 bituminous coal companies to the United States Federal Trade Commission, covering the month of January, 1919, when wages were at their highest point. When the returns were analysed it was found that the average cost of production was 2.32 dollars per net ton, of which wages absorbed 1.74 dollars. Roughly, that was 8s. *per English ton*. As there have been considerable wage reductions since then, it may fairly be taken that the American wage cost is now little, if anything, above 7s. per ton, whilst the latest British figures —those for March—show wages at 27s. 9½d. *per ton*. Let it be repeated and emphasised that in our case it is not the wage per man or per week, but the wage per *ton* that counts.

A BRITISH DISCOVERY RE-DISCOVERED.

Great interest was caused recently in London by a demonstration, given before the Institution of Electrical Engineers, of a strange phenomenon alleged to be absolutely new to science. When an electric current is passed through a half-conducting material, such as lithographic stone, in close contact with a metal, the metal and the stone stick together with a force which is out of proportion to the strength of the current passing from one to the other. The demonstrators, who came from Scandinavia, showed how this phenomenon could be applied in making a loud-speaking telephone. By its help they made a violin reproduce music played in a distant room and "speak" words spoken into a distant telephone transmitter. This demonstration was, however, followed very soon by proof that the phenomenon had been discovered many years before in Great Britain, and its application to telephony had actually been described before learned societies and in a popular encyclopedia. The discovery in Scandinavia was therefore a re-discovery, and the incident suggests that the past records of British research and invention may contain more hidden items capable of practical development in the light of the fuller knowledge now available.

* * * *

"CARRYING ON" IN SPITE OF NO COAL.

It is universally recognised that British engineers display their highest qualities in the most serious emergencies, and this fact was amply proved during the recent prolonged coal stoppage. The electricity supply stations kept going by means of rapidly installed oil burners, and the gas works maintained an uninterrupted supply for a far longer period than was thought possible, by means of utilising their stores of coke in the production of water gas. Another interesting development of a more homely character was the institution, in Birmingham, of central supplies of hot water. These supplies were instituted for the benefit of the poor, who needed all their exiguous provision of coal for cooking purposes.

* * * *

A MONSTER BRITISH CASTING.

One of the largest, if not quite the largest, steel ingot mould ever made was recently cast in Great Britain. It is over 15 feet long and its diameter is over 9 feet. This mould, which will be used for the casting of steel, was so huge that it was almost too large to be conveyed on the railway, and great ingenuity was exercised in arranging it for transport. It was carried on a huge steel girder which rested on two 8-wheeled trucks, between which the mould hung. The weight of this record casting was 87½ tons.

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Coal and its By-Products.

SOURCES OF WEALTH FOR SOUTH AFRICA.

(By James Cumming.)

Passengers by train through Northern Natal cannot fail to be struck by the appearance of the enormous " dumps " of debris and refuse around the pit-heads of the numerous collieries from Ladysmith, throughout the Waschbank and Glencoe districts and onwards to Dundee, Hatting Spruit, Dannhauser, and Newcastle. And these mountains of " refuse " are being burned to waste because we South Africans have yet to learn the great economic and commercial nature and value of their contents. The same remarks apply to the colliery districts of Springs, Brakpan, Middelburg, and other localities in the Transvaal, as well as to the Cape Colony and the Orange Free State; but of the nature of these contents and their value more anon.

So recently as forty years ago coal-mining was practically unknown in South Africa. Coal was certainly excavated in small quantities from surface outcrops in various places, but was condemned for either household or manufacturing or industrial purposes on account of the presence of too great a quantity of sulphur.

A Quartet of Pioneers.

To the efforts mainly of four Natal men, Sir G. M. Sutton, the Hon. C. G. Wilson, Mr. James Ramsay and Mr. Duncan Shaw (all now, unhappily, deceased) is attributable that development of the Natal coal fields which has been of such infinite service to our railways and shipping, while the discovery and development of the Transvaal coal strata, mainly due to the exertions of Mr. Dundas Simpson, have similarly been of vital importance to the gold-mining industry of the Witwatersrand. To-day the output of coal through South Africa amounts to close upon eleven and a half million tons, of an approximate value of £4,519,665—at the pit's mouth—per annum, and gives employment to 2,184 Europeans and 38,930 Natives and Indians, so some idea of the value of the industry to South Africa can be formed. In addition to the fact that our gold mines would be seriously handicapped were it not for the presence of coal in their immediate neighbourhood, there are the great facts that our railways are only economically worked through the same cause; that our goods trains from the coast are always sure of return loads of coal, that our ocean-going steamers not only use South African coal for steam purposes, but can always secure cargoes of bunker coal for return voyages in the absence of other cargo; and that the British Navy can always coal at any of our harbours.

In 1910 the coal output of the whole of South Africa was 4,160,755 tons, while it is now close upon eleven and a half million tons of the value of £4,519,665 at the pit's mouth per annum. In other words the output has more than doubled in ten years, and it is increasing month by month; but to revert to the matter of the by-products, now allowed to go to waste, South African collieries are annually destroying some of the most valuable constituents of their output by burning their so-called " refuse," instead of producing most important industrial ingredients

Mountains of Wealth.

These mountain " dumps " at every pit-head, throughout the South African colliery districts, contain tar, benzine, petroleum, petrol, carbolic acid, aniline dyes, naptha, artificial indigo, creosote oils (so valuable for railway sleepers), anthracene (producing turkey red), salicylic acid, and other costly products, all of which we now import in no inconsiderable quantities from abroad, and some of which in pre-war days (notably aniline dyes) we bought from Germany—though the discoverer, William Henry Perkin, was an Englishman; while we had the raw material right here on our door-step.

We must alter all this. No longer must we indulge in this ruinous practice of buying from oversea what we can produce and manufacture locally. It is not merely the fact that by this ruinous practice we have to pay " through the nose " for all such requirements, but we are recklessly throwing away magnificent opportunities for the profitable employment of thousands of white South Africans, and especially the employment of our rising generation after school-days are done with. It is not only our known and at present worked collieries to which these remarks apply as notable in the Quidini forest of Zululand, in the Vryheid district of Natal, and in other areas of South Africa are vast deposits of coal which not only as coal, but through their vast potentialities in such by-products as above indicated, should prove in the early future to be great wealth-producing factors.

Lonely Reef.

The following are particulars of gold, etc., from the Lonely Mine for the month of June, 1921: Mill ran 690 hours; crushed 5,350 tons; mine gold recovered, 2,017·790 ozs.; value, £8,483 9s. 4d.; slimes treated, 5,350 tons; fine gold recovered, 3,262·739 ozs.; value, £13,721 13s. 3d.; total fine gold, 5,280·529 ozs.; total value at 84s., £22,205 2s. 7d.; profit, £8,352 15s. 3d. Please note the above profit includes the sum of £143 9s. 3d., being adjustment on March and April bullion.

Zaaiplaats Tin Mining Company, Limited.

Results for the month of June, 1921: Mill ran 7 days; concentrates won, 10 tons; capital expenditure, nil; estimated loss for June, 1921, excluding Government taxes and directors' fees, £359 11s. 11d.

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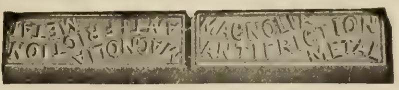

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The Elimination of the Stamp Mill from Rand Metallurgy.

AN EXAMINATION OF STANDARD RAND PRACTICE AND NEW METALLURGICAL IDEAS.

If one follows the development of metallurgical practice on the Rand, one finds that although numerous additions have been made to existing plant, with a corresponding increase in efficiency and extraction, no startling departures from general practice have been made since the introduction of tube-mills sixteen years ago.

The stamp mill of the pioneer days still exists, but in a form accompanied by many and varied improvements. When in the early days this device was thought sufficiently effective as a gold extractor, the tube-mill was unthought of. However, the significance of fine grinding and further extraction soon gained a footing, followed by the establishment of the more modern sand and slime treatment. The advent of slime agitation and more improved methods of separation of slime and solution were merely additions to the existing practice, and do not represent revolutionising changes.

The functions of the stamp mill have gradually been changing with improving practice. While in the olden days the total recovery was obtained from the battery plates, present practice has in some cases deprived the mill of this function and is using it simply as an intermediate crusher between the breakers at the shaft and the tube-mills. If, then, the stamp mill has developed into an intermediate crusher, is it not possible to achieve this function in a more compact and less expensive plant? It is said that the stamp mill brightens the gold and renders it more susceptible to amalgamation. This is so; but it does not follow that other fine-grinding appliances do not achieve this object. The following figures briefly reflect the possibility of displacing the stamp mill as an intermediate crusher by means of more efficient and less costly methods.

All calculations are based on a mine with an assumed capacity of 2,000 tons per day brought to the surface, and grading analyses and data on crushers are obtained from well-known works on the subject.

The average ore brought to the surface from a mine contains 30 to 50 per cent. of material which is suitable for direct crushing in the mill. The remainder is usually hand-sorted and crushed before joining the fines on the way to the mill.

A grading analysis of the rock as hoisted is not available, but the following figures represent average mill feeds:—

Mill Feed: Grading Analysis.

Mesh (inches).	No. 1 Mine.	No. 2 Mine.	Average of two mines.
+ 2	42·52	32·08	37·3
+ 1	19·33	15·53	17·43
+ ·25	22·35	28·97	25·66
+ ·15	4·43	6·13	5·28
– ·15	11·37	17·29	14·33
Total + ·25	84·20	76·58	80·39
Total – ·25	15·80	23·42	19·61

In a mine hoisting 2,000 tons per day 30 to 50 per cent. consists of fines suitable for direct crushing in the mill; hence it can be assumed that an average of 40 per cent. of the 2,000 tons consists of material represented by the grading analysis. This amounts to 800 tons, of which about 19 per cent. is – ·25-inch material which is suitable for direct treatment in the tube-mills. A grading analysis of this material is as follows:—

Grading Analysis of —.25 from above Mill Feeds.

Mesh.	No. 1.	No. 2.	Average.	Pulp from stamp mill with 72-inch screen aperture.
+ 60	42·2	40·7	41·45	62
+ 90	9·6	8·6	9·1	10
– 90	48·2	50·7	49·45	28

An examination of the numbers shows that there is no discrepancy in the —90 material but a large excess over that contained in the discharge from a battery with a .27 inch screen. If, then, the —.25 inch material hoisted be removed prior to crushing in the mill, then the load on this appliance is decreased to a not inconsiderable extent. If crushing in stages is employed and fines removed after each stage, then the mill can in the long run be done away with, and its additional function, namely, that of brightening the gold left over to the tube mill circuit. That the tube mills are efficient liberators of the gold is proved by the fact that amalgamation is practiced in the tube mill circuit. Gold which is not recovered on these plates is extracted in the subsequent treatment.

A proposed stamp-mill free flow sheet is as follows:—The ore from the mine passes a 1½-inch mesh revolving trommel from which the fines go to a bin, and the oversize is hand sorted. The waste is rejected, and the remainder crushed in a battery of Blake crushers to 1½ inch size. The crushers discharge into the bin. From the bin the ore passes into a number of revolving trommels of ¼-inch mesh. The undersize goes to the pumping pit of the tube mill circuit, while the oversize goes to a pair of rolls set to ¼-inch. The crushed product from the rolls returns to the ¼-inch trommel, and material fine enough for the tube mill circuit is allowed to pass through.

The size of the plant calculated on a 2,000 ton basis is as follows:—Mine output = 2,000 tons. Assume 25 per cent. of output to pass 1.5-inch mesh, then allowing 2 per cent. loss by hand sorting, 1,470 tons remain to be crushed. Selecting Blake crushers of the following dimensions:—Jaw opening, 24 in. by 13 in.; capacity, 360 tons 24 hours down to 1½ in.; speed, 300 revolutions; h.p. required, 20; cost of crushing at 3½d per ton; the number required becomes:—

$$\frac{1470}{360} = 5 \text{ units.}$$

The total product now reduced to 1½-inch size is as follows:—

By Blake crusher	1,470 tons.
By 1½-inch trommel	500 tons.
Total	1,970 tons.

The grading analysis of a typical Blake crusher product is as follows:—

Mesh inches.	Per cent.	Remarks.
+ 1.25	51.2	Total + .25
+ .625	24.0	= 88.3%
+ .25	13.1	Total – .25
– .25	11.7	= 11.7%

The – .25-inch material in the crushed product in the bin is as follows:—

From Blake Crusher = 11.7% of 1,470 =	172 tons.
From 1½-inch. trommel = 19% of 500 =	95 tons.
Total	267 tons.

The charge to the rolls then becomes:

$$1{,}970 - 267 \text{ tons} = 1{,}703 \text{ tons.}$$

Using rolls of the following size:—Size rolls, 16 in. by 36 in; size feed, 1½ in.; rolls act at ¼ in. capacity 264 tons 24 hours; speed, 40 revolutions; power, 22 h.p.; cost per ton crushed, 4½d; the number required becomes:—

$$\frac{1{,}703}{264} = 7 \text{ units.}$$

As each set of rolls works in conjunction with one ¼-inch trommel, 7 trommels will be required.

The charge to the ¼-inch trommel is as follows:—

Undersize from 1½-inch trommel	500 tons.
Blake crusher products	1,470 tons.
Rolls products	1,703 tons.
Total	3,673 tons.

$$\text{Capacity of } \tfrac{1}{4}\text{-inch trommel} = \frac{3{,}673}{7} = 525 \text{ tons each}$$

The horse power required to run a plant of the following description would be as follows:—

1½-inch trommels	4
¼-inch trommels	10½
Blake crushers	100
Rolls	110
Elevators	3
Total	227½ H.P.

The minimum figure for a stamp mill with a 2,000 ton capacity, a stamp duty of 15 tons per day, stamps weighing 1,500 lbs. and crushing to —.27 inch mesh, is as follows (8 in. drop allowed for):

$$\text{No. stamps required} = \frac{2000}{15} = 140$$

H.P. = 403

Working costs per ton on proposed plant in pence:

	Pence.
Sorting	3
Breaking (Blake crusher)	3½
Rolls	6
Elevators	½
Trommels	1
	14

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Working costs in pence per ton with stamps:

	Pence.
Sorting	3
Breaking	3
Transportation	2
Milling	18
	26

The figures for the proposed plant are based chiefly on manufacturers' specifications after having made a 60 per cent. increase to suit them to local practice.

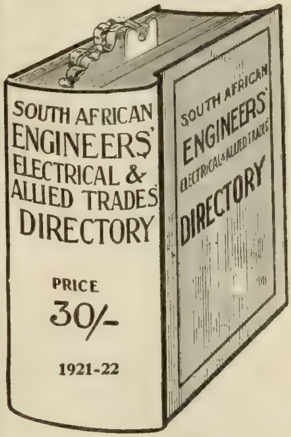
However, the chief object of reproducing these figures is to show that reduced milling costs are possible, and not so much to show to what extent such a reduction is possible. The latter figure depends upon the type of plant selected and the local conditions surrounding it.

So far no mention has been made concerning the effect such crushing will have upon the tube mill circuit. To determine this effect one must have a grading analysis of the —¼ inch material produced in order to compare it with a —¼ inch discharge from a stamp mill. The product with the larger percentage of coarse material will place the greater load on the tube mills. However, this increased load cannot be so great as to seriously effect the tube mill circuit.

Amalgamation will follow the tube mills in order to remove the free gold and after that the sufficiently fine material will proceed to the cyanide plant in the usual manner.

In conclusion, it would be instructive to note how capital costs in such a plant would compare with those of the stamp mill. Little doubt remains as to which plant will be favoured in this respect.

For some months past, says the Elliot paper, rumours have been in circulation locally of important discoveries of platinum deposits in this and the Engcobo districts. It was generally known that options had been given on a number of Elliot farms, and that a large number of claims had been pegged in the Engcobo district. We have now received information from an authoritative source, adds the paper, that one of the richest platinum deposits in South Africa has been discovered in this neighbourhood.



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OUR COAL NUMBER.

Our Second Special Coal Number is now in the press and will be on sale next week. In view of the large amount of additional material which has had to be included in the Number and on account of the excessive cost of production, it has been decided to increase the price to five shillings. The Number will constitute a bulky volume of over 200 pages and within its covers will be found articles on every conceivable aspect of the South African coal trade. Every colliery of importance in the Union and Rhodesia is dealt with, and there are valuable contributions by expert technical writers and colliery managers on the History, Geology, and Technology of South African coal. The Number contains many new and excellent photographs and valuable maps and diagrams of the coal fields, whilst an attractively drawn cover adds greatly to the appearance of the issue. It is safe to say that at five shillings this is the cheapest technical work published in this or any other country.

EDITORIAL.

THE INDUSTRIAL IMPASSE.

At the time of going to press the industrial position on the Witwatersrand again appears to be critical. The long and tedious exchanges of letters between the Chamber of Mines and the Trades Unions, and the innumerable conferences which have been proceeding ever since the Chamber opened the ball in the matter of wage reductions on the mines by its letter of May 18th, have culminated in the Chamber announcing that it will enforce a reduction of 1s. 6d. per shift as from Monday next and in the taking of a strike ballot by the men's executives.

We are not going to endeavour to predict what the results of the ballot will be, nor are we in a position to foreshadow the events of the coming week. Johannesburg has often been reminded of the fact that it is situated in the middle of a social volcano, and when things start moving here they move with lightning rapidity. The situation is so complex that it is impossible to gauge the consequences of procrastination and weakness on the part of the Chamber and of a refusal to face indisputable economic facts on the part of the leaders of the men. Wages are far too high on these fields, and efficiency is far too low. On these matters we are heartily in agreement with the Chamber and with the mining houses. We have said this in and out of season for months past, and have repeatedly urged the heads and nominees of the Industry to take steps to put mining on these fields on a sound and efficient basis.

This journal hammered at the Chamber until it abolished the stupid practice of collecting doles for the Trades Unions and until it recognised the folly of sacrificing zealous officials because the men objected to them. To talk as the chairman of the Trades Union Department of Mining Industry did at Benoni on Wednesday night, when he said that during the last few years the workers on the Witwatersrand gold mines had made great sacrifices in the interests of the community as a whole is sheer unctuous bunkum. What sacrifices have they made? They have drawn high rates of pay—for the amount of work the average Witwatersrand miner performs they are probably the most highly paid supervisors in the world. They live under social conditions which are at least as good as those existing in any other gold field, and the sacrifices they have made on behalf of the community as a whole have merely amounted to this—that the workers, aided and abetted by a weak-kneed policy on the part of the employers, have brought many mines face to face with ruin. But for the saving grace of the gold premium, the Rand would have degenerated to the industrial level of the Cornish tin mines and Johannesburg would be in as poverty stricken a condition as Camborne and Redruth are to-day.

We have for long urged the Chamber to take some firm and decisive action in the matter of reducing wages. Nobody wants a strike, but we have contended for months past that it would be better to fight the matter out rather than to be constantly conceding and delaying and to live continually in fear of the tyranny of the trades unions. The Chamber's original intention was to reduce wages 3s. per shift, but the employers handled their case badly and instead of forcing a cut in pay when the unions were disorganised after the fiasco of the February strikes and when the price of gold was falling, the Executive of the Chamber of Mines waited until labour had reconsolidated its forces and the selling price of the product of the mines was rising.

What the price of gold is to-day we are unable to ascertain. No cable available to the public recording gold sales was received in Johannesburg from July 21st to July 28th, although we know all about the Fourth Test match on Monday and the heat wave in Mesopotamia on Tuesday.

The price of gold, of course, has entered into this wages dispute pretty extensively, but whether the selling value of the product of the mines goes up or down the necessity that exists for reducing working costs and improving efficiency on the Rand will not be affected. As we have often said, we have got to get back to a basis of something less ephemeral than the incidence of the American exchange, and we have looked to the Chamber of Mines to secure such a basis.

We hoped that when the Chamber said that it was intended to reduce wages by 3s. per shift, the Chamber meant what it said and would enforce such a reduction. Unfortunately the Chamber shifted its stand and it is probable that if there is going to be a strike it would not have been worse on a three shilling disagreement than it may be over a question of eighteenpence.

For weeks the men's leaders have been playing for time and the workers along the Reef have been secretly laughing up their sleeves. But the latest proposal of the trades unions is such a transparent piece of bluff that even the Chamber has seen through it.

In a letter addressed to the S.A. Industrial Federation on Wednesday, the Chamber wrote: "The counter proposals put forward by the unions are: First, that no decreases whatever should take place until after January 1, 1922, when, subject to the Chamber having agreed that so large an amount as one-half of the increases connected with the £2 8s. per week increase should be unaffected by any fluctuation in the cost of living, the unions would recommend their members to accept a reduction which may easily prove to be only one shilling or one shilling and sixpence per shift; and secondly, that the executives were prepared to agree to the retrospective application of any agreement arrived at to August 1, 'or such other date as may be agreed upon in negotiation.' It surely does not require a further series of conferences to show that the first proposal is entirely at variance with the spirit in which the increases in wages were granted and accepted; or that the second proposal leads nowhere but back to the position before negotiations were commenced."

The Chamber also points out: "The unions appear to have lost sight of the fact that, when the £2 8s. increase was granted, it was accepted that a change of economic circumstances would necessitate a re-arrangement of wages." Months ago, when we urged the Mines to resist the demand for the £2 8s. increase we pointed out that, having once gained possession of that increase the unions would not surrender it without a struggle, no matter what "change of economic circumstances would necessitate a re-arrangement of wages" in the opinion of the Chamber.

It seems that at last conferences and letter writing and the spirit of a peace which passeth all understanding are at an end between the Chamber of Mines and the men's executives. We do not know what the upshot of the whole business will be. We can only appeal to the men to play the game and respect agreements made by the Mines in a spirit of generosity which we have always regarded as weakness. Times are bad, money is tight, and unemployment grows in our midst. A strike will only make things much worse and the principal sufferers will be the men and their families. The Chamber of Mines has dealt with its employees more than liberally. Any more strongly constituted body would long ago have tired of the playing for time tactics of the men's leaders and would have enforced the reduction. The men will therefore be well advised to accept the 1s. 6d. "cut." If they refuse to do so we can only hope that, much as everybody wishes a strike to be averted, the Chamber will at last dig its heels firmly into the ground and will refuse to be bluffed and intimidated any further.

NATIVE LABOUR ON THE MINES.

The attack made by the Rand Native delegate at the Capetown Conference of the Commercial Workers' Union on the present native recruiting contract system on the mines of the Rand seems to be symptomatic of native thought to-day. That is, to our mind, the most important feature of the utterance which has excited so much interest and controversy during the week. Ever since the native strike on the mines there seems to have been an undercurrent of discontent at work among the native workers on the mines, and the undercurrent is now manifesting itself at the Capetown Conference. It seems that the President, Mr. Selby Msimang, after warning his hearers against indulging in wild talk, delivered himself as follows:—" Their first duty was to organise all non-European workers, educate them and make them understand and appreciate the obligations which fell upon them as workers in safeguarding the interests which were theirs and inalienable. "Proceeding, he said that there were two desperate forces to contend against. One was the European trade union menace, which looked upon them as a monster threatening to filch their pockets. For that lazy job they were paid 20/- a day as against 2/- paid to actual workers and producers of the country's wealth. It remained to be decided whether to accept the challenge or to ignore it, to extend a hand of fellowship or to reciprocate the insolence, but before they could do either they must organise.

Amongst the statements made by the Johannesburg delegate we note particularly that he said the natives' principal demand was for increased pay in order to meet the increased cost of living. What the natives could not understand was that when the Europeans struck, their grievances were redressed and their wages raised, but when the natives struck they were refused amelioration and were overawed by the military. He complained that when an industrial dispute arose the Government did not consult the leaders of the natives. The mines had put up the excuse that the natives in the compound were not affected so much by higher prices owing to their receiving accommodation and rations. The men, he declared, were also exploited in regard to the amount of work to be done each day. Tasks above the average were set up and when the required amount of work had not been done they were penalised and when they complained they were told that they were under contract. This was nothing more than forced labour and tantamount to slavery.

Stripped of exaggeration and characteristic native hyperbole (which Mr. H. M. Taberer has disposed of effectually in the daily Press), all this amounts to an indictment of the "colour bar" which the natives are beginning to see is at the root of all their troubles. The present recruiting system, with its possibilities of abuse, is essential to the working of the mines in the absence of the more attractive terms of labour which could only be offered were the artificial restrictions on the remuneration of the native according to ability removed. Mr. H. M. Taberer, the General Superintendent of the Native Recruiting Corporation, and the acknowledged leading authority on native labour questions in the country, has put it on record that under the present system the native is given no inducement whatever to become a constant and economic factor in the industry; his colour is his handicap. It seems to us indeed that most of the troubles of the industry are due to the uneconomic and unfair treatment of the native worker. The present system is morally and industrially indefensible. Until it is done away with, the native is not given a fair deal, the industry is heavily handicapped, and the progress of the whole country is retarded by the maintenance of a system as artificial as it is unjust and inequitable.

The Business Outlook.

The President of the Chamber of Commerce, Mr. R. Blane, made an interesting analysis of the business position at the monthly meeting of the Chamber last week. Mr Blane put the matter in a nutshell when he said that we were suffering from the inevitable reaction and trade depression following the abnormal post-War prosperity. He showed that the reason was the financial state of affairs existing overseas, he rightly opined that there was not much hope of improvement until the position in overseas countries was established on a firmer basis, and until social and economic influences take a turn for the better. In other words, South African trade cannot escape the consequences of the chaotic conditions elsewhere. Its imports and exports are vitally affected thereby and all we can do is to await the return of better world conditions. Meanwhile Mr. Blane urged Government, public bodies, and everyone to exercise the utmost economy and care.

Notes & News.

An Industrial Conference.

A congress of Chambers of Industries has been held this week at Port Elizabeth under the presidency of Senator T. A. White. The Minister of Mines and Industries opened the conference and addressed it on the aims and objects of the new Board of Trade and Industries. It seems that the personnel of this body is being severely criticised in some quarters, and the industrialists gathered at Port Elizabeth also seem sceptical of its ability to perform satisfactorily the long list of functions assigned to it.

* * * *

The Living Wage.

It has been assumed that a living wage means a sufficient sum of money week by week to maintain a man with his wife and three children. Miss Eleanor Rathbone, a lady with much experience in sociology, challenges the assumption that the average family consists of five persons. She points out that as a matter of fact only 18·7 per cent. of families come up to that number. Consequently, if the standard wage is fixed at such a figure as will provide for the maintenance of five persons, a very large majority of workers will obtain much more than they require to maintain themselves in comfort and efficiency.

* * * *

The Big Drop in Diamond Production.

The total diamond output for the Union during the six months ended June 30 naturally shows a big drop in the quantity and value. It amounted to 519,892.06 carats, valued at £2,069,275. This last figure is the value of the production. The value of the sales for the half-year is not yet ascertainable. Against these slump figures may be set the record boom returns of last year before even the market had gone to pieces. For 1920 the total diamond production of the Union was 2,545,000 carats, valued at £14,762,899, the sum realised by the total sales being £10,163,941, an average of 115s. 2d. per carat.

* * * *

The Crown Mines Income Tax Case.

Judgment was given this week in the case in which the Crown Mines took action against the Inland Revenue Department for a refund of dividnd taxes paid on sundry annual redemptions of a debenture issue. Mr. Justice Ward, in delivering a lengthy judgment in the matter, found that the sums paid by the company were not properly chargeable under the Act. Although he thought a mistake had been made in regard to the question as to whether there had been an excess payment or not, he found that there was in the cricumstances no appeal against the decision of the Commissioner of Inland Revenue. Judgment was accordingly given in favour of the latter with costs.

* * * *

Oil Prospects in Cape Colony.

In another part of this issue will be found the complete report made by Dr. Wagner on the Carnarvon borehole. Dr. Wagner's conclusions were printed in our last issue, and a perusal of his facts and arguments, coupled with analyses made by Dr. McCrea, leaves no doubt regarding the accuracy of his judgment. It may be mentioned that Mr. Cunningham Craig reported unfavourably on the prospects of finding oil at this point, but that drilling was continued despite his warnings. In this connection it may also be recalled that Mr. Cunningham Craig advised that the part of the country most favourable to oil was the folded belt of the Karroo beds about thirty miles north of Port Elizabeth. No drilling, as far as we can learn, has ever been carried out on that line either by Government or private enterprise. The Government, it is true, did commission the Director of Geological Survey to report on the country in question, and as that report was not encouraging, nothing more was done. It seems a pity that so much money and honest effort have been wasted at Carnarvon, where the geological conditions are so obviously unfavourable to the finding of oil.

June Gold Mining Returns.

The monthly analysis sheet published by the Chamber of Mines has some interesting features in its June issue. During the month the 39 producing mines of the Rand made an average working revenue of 35s. 10d. per ton milled; working costs averaged 25s. 10d., leaving a net working profit of exactly 10s. per ton. For the outside districts the average working profit per ton was 6s. 8d. Taking the combined Rand and outside districts, the average working profit per ton was at 9s. 11d., the highest for any month this year. The total Transvaal gold return for the six months was valued at £20,241,166. Gold was taken at £5·375 for the June month—the highest figure for any month this year.

* * * *

Wage Reductions.

In view of the movement to reduce wages in the mining and building industries of the Rand, it is noteworthy that the British Ministry of Labour reports that changes in rates of wages which came into operation in May, in those industries for which statistics are compiled by the Department, affected about 1,570,000 workpeople, of whom about 1,335,000 sustained decreases amounting to over £400,000 for a full ordinary week, and 235,000 received increases, amounting to about £55,000 a week. The principal groups of workpeople affected were workmen in the building trades, in nearly all the principal centres, whose rates of wages were reduced by 2d. an hour; men employed in the shipbuilding and repairing industry, who sustained reductions of 3s. a week on time rates and 7½ per cent. on piece rates; men in the merchant shipping service, whose rates of pay were reduced by 50s. a month, or 8s. 6d. a week; hosiery workers in the Midlands, whose " bonus " of 1s. 2d. on each shilling of earnings was reduced to 1s. 1d.; and men and women in the brickmaking industry, whose rates were reduced by 6s. and 3s. a week respectively. Among other large bodies of workers who sustained decreases were men employed by electrical contractors, steel smelters, tinplate workers, hollow-ware makers and brass workers in the Midlands. Since the beginning of 1921 changes in rates of wages reported to the Department have resulted in a reduction of over £1,300,000 in the full time weekly wages of over 3,600,000 workpeople.

* * * *

Boring at Luipaardsvlei 10.

Although much energy had been expended in sinking boreholes in the Luipaardsvlei vicinity, no success has been achieved until quite recently when the gold bearing reef was struck. Past failures were accounted for chiefly by the fact that bores were put down in places where the Leader and West Reef were not to be found. It is well known that the ground between the Witpoortje and Roodepoort faults consists of Government beds and some superimposed strata which have been thrust up.

Recently a bend in this formation on the farm Luipaardsvlei had been located, and this led the prospectors to assume that this portion of the formation at least was continuous. As the effects of the Roodepoort fault could only be traced a good distance to the South East they correctly assumed that the Leader and the West Reef should be found under the Dolomite in that direction. Accordingly, a borehole was put down in a direction South East of the former attempts, and after passing through beds of the Dolomite and Black Reef series, the Witwatersrand System was struck and eventually the West Reef at a depth of over 700 feet. The Witwatersrand beds passed through had a 40 degree dip and showed the same sequence one would expect to find on any undisturbed portion of the West Rand. The leader was not struck in this bore on account of the hole not being put down sufficiently far in the direction of the dip. A second bore is being started which should intersect both reefs. This hole is being located further down in the direction of the dip of the beds. Calculations based on the results of the first hole show that the West Reef outcrops at a depth of about 300 feet at the contact with the superimposed beds.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Coal.

Fuel Problems of the Future.—*Colliery Guardian*, July 1, p. 25.

Spontaneous Combustion and Coal Structure.—*Colliery Guardian*, July 1, p. 38 and p. 42.

Coal Cleaning Processes.—*Colliery Guardian*, July 1, p. 41.

Metallurgical.

Blast Furnace Gases.—*Iron and Coal Trades Review*. July 1, p. 13.

Mining

Reinforced Concrete Headgears in France and Belgium.—*Colliery Guardian*, July 1, p. 27.

Engineering.

Power Transmission at 220,000 volts.—*The Electrical Review*, July 1, p. 31.

Steam v. Electric Winding.—*The Iron and Coal Trades Review*, July 1, p. 14.

Death of Sir T. Wrightson.

Sir Thomas Wrightson, Bt., a notable captain of industry, died in mail week, aged 82. The Wrightsons are an old South Durham family that have for many generations held land on the banks of the Tees, and the beautiful Neasham Hall estate, which became Sir Thomas's home in later life, had been in the possession of his ancestors. He was born at Haughton-le-Skerne, near Darlington, in 1839, and was educated at private schools and at King's College, London. Deciding on engineering as his profession, he served his articles with his cousin, Lord Armstrong, of the famous Elswick works, passing from Elswick to Westminster, where he applied himself for some years to civil engineering, thus laying broad and deep the foundations of his professional training. At the age of 25 he went to South Stockton—as Thornaby was then called—to take up employment at the Teesdale Ironworks of Messrs. Head, Ashby & Co. Shortly afterwards he joined the firm, which now became known as Head, Wrightson & Co., Ltd. Of this undertaking, which is one of the largest of its kind in the kingdom, he was for many years vice-chairman, and latterly chairman. He was also at one time a director of the North-Eastern Steel Company, Ltd., at Middlesbrough, and was chairman of the Cramlington Colliery Company in Northumberland. For upwards of 30 years Wrightson was closely identified with the public life of Stockton and Thornaby. He was an active member of the Tees Conservancy Commission, and for several years filled the position of chairman of the Works Committee on that body. Wrightson's political career dates back to the early 'eighties, when he was adopted as Conservative candidate for the borough of Stockton, which had then been Liberal ever since its enfranchisement in 1868. Wrightson fought perseveringly, failing in 1885, 1886, and 1888, but each time reducing the majority, until, in 1892, he had his reward, and for the first time Stockton returned a Unionist member, Sir Horace (afterwards Lord) Davey being left in a minority of 311 votes. At the General Election of 1895, however, Mr. Wrightson failed to hold the seat, and thereafter he retired in favour of his friend, Mr. (now Sir) Robert Ropner. In 1889 he was invited to contest St. Pancras East at a by-election and was returned by a majority of 910 over Mr. J. M. Astbury, Q.C. (now Mr. Justice Astbury). He continued to sit for St. Pancras East till January, 1906, when he was defeated. His services were recognised in 1900 by the conferment of a baronetcy.

The Cost of Living.

Now that so much is heard about the cost of living it is of interest correctly to define the phrase in Great Britain. In one of the Australian States an attempt has been made to get over the difficulty by compelling the employer to pay a portion of his total wage bill into a special fund, from which men with families would receive additional remuneration. The Maintenance of Children Bill failed to pass the Upper Chamber in New South Wales, but the principle has been adopted by the Federal Government, which proposes to introduce a similar Bill into the Commonwealth Parliament. Mr. Hughes defends the Bill by saying that "the attempt to pay a minimum wage to every one on the five-member family basis would ruin the country." Mr. Hughes's scheme contemplates a fund of £28 millions a year, out of which 12s. a week could be paid to mothers for each dependent child. A scheme of this kind is actually working in the Roubaix-Tourcoing district. Every important firm in the district is affiliated to a Consortium and pays contributions according to the total number of its employees, married or single. In the factory, wages do not vary as between single and married workers, but the Consortium pays a bonus to every married man in respect of every child under 13, and a premium on every increase in family. Mr. Dampier Whetham, of Cambridge, supports Miss Rathbone's proposal, but insists that it must be carried out trade by trade, and suggests that the sum paid from the fund for each child should be a percentage of the father's earnings and not a fixed sum per child, because the standard of life and the cost per child are higher among the skilled artisans. Miss Rathbone's proposal is not intended to increase the cost of labour, but rather to reduce it by paying high wages only to those men who really need them; as she explains, if industry is to revive, "costs of production, and among them those of labour, must be reduced." The real problem is how to do this with the least hardship to the present and the least injury to the coming generation. Statistics worked out by the London School of Economics on the basis of Professor Bowley's investigations show that of English male workers over 20 years of age, 27 per cent. are bachelors or widowers without dependent children, 24·7 per cent. are married couples without dependent children below 14, and 16·6 per cent. have one dependent child. It is evident that the cost of living theory, as promulgated by the Ministry of Labour and the trade unions, results in an over-payment for 68·3 per cent. of wage-earners for the benefit of 31·7 per cent.

Concerning Mines and Men.

Mr. D. Wilkinson is leaving on a six months' visit to England.

* * * *

Mr. D. M. Davidson, the general manager of the East Rand Foundry, had a nasty accident with a motor car recently. We are glad to report that his broken leg is now set, and that he hopes to leave Germiston Hospital some time early in August.

P.O. Box 3807.
ROCKWOOD PRESSED STEEL UNIONS
H. ALERS HANKEY - - - Sole Agent.

Fires on Board Ships.

BOARD OF TRADE INQUIRY.

Fires on board ship were very frequent during 1919 and the following year. There were several outbreaks on ships carrying South African coal, either as cargo in the holds or as fuel in the bunkers. As the risk was a great and increasing one, the representatives of Lloyd's and the Liverpool Underwriters' Association conferred with the Board of Trade, with the view that their machinery should be utilised to investigate such cases as came within their purview. As a result, the Board of Trade will (reports "The Syren") shortly issue a report of 114 cases investigated by their surveyors. An analysis of these cases has been prepared by the Board's engineer surveyor-in-chief. This should be of great value at a time when the coal trade of the world is upset, and little care is bestowed upon the safety or otherwise of coal carried in holds or bunkers, and when the number of oil-burning ships is increasing very rapidly. In 1919 it was generally thought that there was a wave of incendiarism passing over the world, and that some fires on shipboard were due to this cause. The Board of Trade investigations do not, however, support this supposition. Neither do they suggest that "spontaneous combustion" is altogether so guilty as was generally alleged. Some of these alleged cases are described as "possible" or "probable," "thought to be," and "spontaneous combustion or lighted match."

However, as there are 39 cases of alleged spontaneous combustion on vessels carrying other than coal cargoes, the phase of the subject is a very important one. Hemp and jute cargoes had seven fires; sugar in bags, six; cotton bales, four; and oilcake and rags and flax waste each had three. But these materials require extra care as to the condition in which they are shipped, bagged and stowed. The neglect of due precautions increases the tendency which some cargoes have to fire spontaneously. This cause figures still more largely in the case of coal, and the section of the report dealing with coal fires occurrent in cargo or bunkers will, when available in full, inculcate some useful lessons. From the covering observations of the engineer-in-chief it is noticed that almost any coal would appear to possess inherent vice, as the cases investigated apply to the following coals: American, 22; English, 21; Welsh, 15; South African, 8; Asiatic, 7; Australian, 4; Scottish, 2; Canadian, 2; and German, 1.

There appears to be evidence, the report states, where partly empty bunkers are filled with coal. The coal which has been left in the bunker is liable to become overheated and to fire. Nearly all the fires occurred in the bunkers. These are situated near the stokeholds and are exposed to the heat of the stokehold, which would naturally hasten the process of spontaneous combustion. With regard to explosion among burning coal, it is noted that in the case of the "Luneberg" steam was used to extinguish the fire, and a succession of explosions occurred. Explosions also occurred on board the "Clan Skene," in which there is no mention of steam having been used for extinguishing purposes. This has been due to the distillation of coal gas by heat, which, mixing with the proportion of air, has exploded on contact with fire. In the "Luneberg" and "Sydney," both originally German steamers, the coal had been in the bunkers some years; the next longest period the coal had been on board was six months. Otherwise, the period of heating until fire actually occurred appears to have been between three weeks and three and a half months. There are exceptional cases, however, viz., the "Clan Macmaster," in which the bunkers were filled after having been swept out, and a fire broke out in one bunker in four days' time, and in another a few days afterwards; the "Vestris," in which the fire occurred whilst the vessel was still in Hoboken, the coaling port; and the case of the fire on the "Hakan," in which the cargo of gas coal took fire on the short voyage from Newcastle to Southampton. Bunkers should be tight, to prevent air from passing through the coal, and thus providing oxygen, the absorption of which is attended with overheating. Unless the heat of absorption can be carried off as quickly as it is generated, overheating will occur. Coal remaining in bunkers should be moved to where it can be used first. Small coal is more liable to spontaneous combustion than large coal. Water is the best medium for extinguishing coal fires. It is added, in conclusion, that all coal is, apparently, liable to spontaneous combustion. When it does occur on board ship, it is probably due to fortuitous conditions in regard to the rate and supply of air and the rate of escape of the heat generated. A slight change of the conditions either way may mean the difference between overheating and the absence of it. Hence a ship may carry coal in the bunkers without fires occurring over a long period of years.

Bantjes Consolidated Mines, Limited.

The work accomplished in the 11th level west drive by the Consolidated Main Reef Mines and Estate, Ltd., during the quarter ended 30th June, 1921, was as follows: Footage driven, 154; footage sampled on M.R.L., 70; reef width, 4 inches; reef value, 1·4 dwts.; inch-dwts., 6.

NEW PATENTS.

616. Frederick Harvey Treirthick, Buccleuch House, Richmond, Surrey, England.—Improvements relating to feed water heaters for locomotives and like boilers.
633. Aloarado Mining and Milling Co., 347, Madison Avenue, New York, City of New York, U.S.A.—Chloridizing of ores.
634. Aloarado Mining and Milling Co., 347 Madison Avenue, New York, City of New York, U.S.A.—Treatment of ores.
635. Aloarado Mining and Milling Co., 347, Madison Avenue, New York, City of New York, U.S.A.—Treatment of ores.
636. Metallbank's Metallurgische Gesellschaft Aktiengesellschaft, of Bockenheimer Aulage 45, Frankfurt A.M., Germany.—Aluminum alloy and refining process.
639. (1) Brereton Bengers Roberts, Park House, Cinila, Neath, South Wales; (2) Joseph Walters, Warsgwyn Gnoll, Park Road, Neath, Glamorganshire, Wales.—Improvements in boring machines or appliances.
651. International General Electric Co., Incorp., City of New York, State of New York, U.S.A.—Improvements in and relating to regulating systems for alternating current circuits.
652. International General Electric Co., Incorp., City of New York, State of New York, U.S.A.—Improvements in and relating to regulating systems for alternating current circuits.
655. Stewart Hood Crawford Munro, c/o P.O. Box 3146, Johannesburg.—Improvements in valve devices for use in connection with air or water supply pipes.
657. Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., 52, Grosvenor Gardens, London, S.W. 1, England.—Improvements in heating liquids by introducing into molten metal.
658. Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., 52, Grosvenor Gardens, London, S.W. 1, England.—Improvements in recovering gases which have been absorbed by solids.
660. Alexander Spencer, 2, Central Bldgs., Westminster, London. S.W. 1, England.—Improvements in and relating to steam superheaters of the multiple smoke or fire tube type.
661. Alktiebolage Cellurlosa, 41, Regeringsgatan, Stockholm, Sweden. —Furnace for dry distillation of waste liquors and similar masses.
668. Turjus Kolkin, Vadheim in Sogu, Norway.—Improvements in arrangements of electrodes for fusing electrolytic apparatus.
669. National Radio Co., San Francisco, State of Arizona, State of California, U.S.A.—Improvements in apparatus for the production of intermittent or continuous high frequency oscillations.
672. Hans Rathsburg, Nurnberg, Kirchenweg 56, Germany.—Process for the manufacture of blasting caps, primers, firework bodies and the like.
673. John Thomas Brockhouse, Victoria Works, West Bromwich, County of Stafford, England.—Improvements in brake mechanism for vehicles.
675. Martin John Orton, c/o P.O. Box 668, Johannesburg.—Improved means for securing hose pipes and the like.
680. Frederick Victor William Swanton, 99, Nugget Street, Johannesburg.—Improvements in mechanism.
681. Alan John Royston, c/o Box 668, Johannesburg.—Improved means for the generation of power.

Carnarvon Oil: Dr. Wagner's Complete Report.

DETAILED DESCRIPTION BY GOVERNMENT EXPERT—UNFAVOURABLE PROSPECTS OF STRIKING OIL IN THE DISTRICT.

There is no prospect of striking oil in commercial quantities in the supposed " Oil Belt " in the Carnarvon district of the Cape, is the conclusion arrived at by Dr. Wagner, the geologist who was dispatched to Dubbelde Vlei, 60 miles north-west of Carnarvon, to report on a deep borehole which, after many years of unproductive drilling, had recently given certain favourable " indications." Dr. Wagner's report was officially issued for publication last week, and, in view of the tremendous interest which is taken in the subject throughout the north-west district of the Cape, where extravagant hopes have been based on a very insecure foundation, we print the document in full.

At the outset (writes Dr. Wagner) I have to express regret that my report should be unfavourable, as a more courageous and honest attempt to obtain oil by boring has surely never been made. Briefly, the conclusions are as follow:—

(a) The oily matter occurring in the sludge pumped out of the borehole and in thin films on the surface of the circulating water is not a natural product, but is derived from a mixture of anti-friction grease and tallow used for greasing the three lowest lengths of rod.

(b) What were taken to be layers of oil-bearing sand are fissures in gneiss-granite filled with a sandy, clayey gouge.

(c) The gas evolved from the hole is probably a mixture of methane, derived from the carbonaceous " white-band " shales of the Dwyka series, and gas derived from the cracking of the mixture of grease and tallow by heat generated by boring at this great depth.

(d) There is no prospect of striking oil in commercial quantities in the area under review, and further boring is unjustifiable.

The evidence on which these conclusions are based is set forth in the succeeding paragraphs.

Geological Features.

The borehole is situated in the southern part of the farm Dubbelde Vlei, not far from the edge of a great flat-bottomed pan. It has been put down by means of a Sullivan daimond drill, and has attained a depth of 4,610 feet, being cased to 1,000 feet.

The rock exposed at the surface is grey Ecca shale, with an almost imperceptible dip to the south, which has been invaded on a very extensive scale by sills and dykes of dolerite. An interesting contact between an inclined sill and the shale is exposed on the sides of a water hole situated about 100 yards west of the drill. The dolerite is interspersed with small vesicular cavities, and in the neighbourhood of the contact many of these are filled with a light brown oil or with a black ozokerite-like substance due to the inspissation of the oil; the oil itself having evidently been derived by a process of endomorphic contact metasomatism from the shale. The water in the hole which is in contact with the oil-bearing dolerite has an unpleasant oily flavour.

It was the occurrence of this oil—a very common phenomenon along dolerite contacts in the Karroo system—that, I understand, led to the particular locality being selected as the site for a deep borehole.

Records of the Borehole.

Fairly complete records of the borehole have been kept and were placed at my disposal by Captain A. F. Rogers. As far as could be made out from these, Ecca shales and sandstones with intruded sills of dolerite were passed through until a depth of about 1,600 feet were reached. At 1,684 feet the drill entered a thick layer of bituminous (carbonaceous (?)) rock, presumably the " White-band " zone of the Dwyka series. The Dwyka tillite itself was reached at 1,732 feet and continued to 1,860 feet. Below this the drill encountered an older sedimentary formation made up of brownish-red sandstone, brownish-red micaceous shale, greyish-red arkose and grey arkose with small scattered grains of red felspar. These rocks, and particularly the shale and brownish-red sandstone, are identical with those of the Fish River series of South-West Africa, with which they may tentatively be correlated. The beds appear to be disposed horizontally or almost so.

The exact depth to which these rocks extended is not known, as the borehole record is not very clear on this point. At about 2,700 feet, however, the drill appears to have entered the old granite forming the foundation of this part of the country. Various types of granite were passed through; the core heap showing pink, grey, white and reddish varieties. Several patches of white quartzite—presumably xenoliths in the granite—were also passed through. At a depth of a little over 4,000 feet the normal granites are replaced by brownish-red, horizontally foliated, garnetiferous gneiss-granite, containing variable amounts of biotite, and this is still the country rock at 4,610 feet, the depth reached at the time of my visit.

At a depth of roughly 4,400 feet the drill entered a zone of broken ground, and between this and 4,596 feet it apparently passed through several steeply dipping fissures in the gneiss-granite filled with a soft sandy-clayey gouge. The most important of the fissures was entered at a depth of 4,520 feet, and the drill only passed out of it at 4,596 feet, once more entering gneiss-granite; that rock still being much fissured, to judge by the small fragments of core obtained between this and the bottom of the hole.

Oil and Gas " Indications."

To get some idea of the nature of the gouge filling the fissures, samples of the sludge from the pit in which the material flushed from this section of the borehole was allowed to settle were carefully panned. The sludge was found to consist of impalpably fine clay substance enclosing numerous grains of quartz, isolated grains of felspar and garnet, and occasional flakes of biotite. In addition it contains a small percentage of oily matter, and it was in passing through these gouge-filled fissures that definite indications of oil in the form of films on the circulating water and on the surface of the settling pond were first obtained. The fact of the drill passing abruptly from the very hard gneiss-granite into the soft sandy-clayey matter, and definite indications of oil being obtained simultaneously, led—in the circumstances perhaps not unnaturally—to the conclusion that a layer of oil-bearing sand had been struck. Whether any oily films had been observed previously to this, I was not able definitely to ascertain, but from the facts given hereafter I think they must have been.

A small amount of inflammable gas appears to have been given off by the hole ever since it got well down into the Karroo beds According to the testimony of the driller the quantity has gradually increased with increasing depth, but he could not state definitely whether there had been a stronger evolution when passing through the gouge-filled fissures than when drilling in the gneiss-granite immediately above or below

The observed phenomena on the occasion of my visit were as follows: As soon as the water circulation was started causing the water standing at a depth of 170 feet below the surface to rise in the hole, gas began to be evolved, and when the water ran out at the top of the hole it gave off large bubbles of gas. The gas burns with a luminous yellow smoky flame. I endeavoured to catch some of it for analysis, but owing to lack of suitable appliances did not succeed in doing so. From the appearance of the flame, I am prepared definitely to state, however, that it is not pure methane or marsh gas.

Oily Films.

Oily films were also noted on the circulating water, and on the outside of a bag which had been tied over the end of the discharge pipe leading from the borehole in order to catch anything of a solid or semi-solid nature coming out of the hole.

On opening this bag, after the pump had been at work for several hours, it was found to be lined with black oily sludge, representative samples of which were taken for analysis.

Before proceeding to discuss the origin of the oily matter and of the gas, brief reference may be made:

(1) to the probable temperature at the bottom of the hole. This must be fairly considerable, judging by the temperature of the water coming out when the water circulation is started. I should say that it was at least 100 deg. F.;

(2) to the fact that, apart from local accumulations of ground water along dolerite contacts, the rocks passed through by the borehole are absolutely dry. No water was struck in the hole itself. Indeed, it loses water; that pumped into it standing at a level of 170 feet below the surface. This is of great significance from the point of view of the oil seeker, because the ordinary laws governing the migration and accummulation of oil in rocks are dependent on the difference in specific gravity and surface tension between oil and water. Thus, whereas oil in the presence of water moves upward, it moves downward in dry rocks under the influence of gravity.

Origin of the Oily Matter and the Gas.

The only rocks in the area under consideration capable in any circumstances of yielding oil are the shales of the Dwyka and Ecca series, traversed in the first 1,700 feet of the borehole. The dry character of the rocks traversed notwithstanding, the inherent improbability of oil derived from the Karroo beds having found its way into fissures in the gneiss-granite almost 3,000 feet below their base is so enormous that I began at once to look for another possible source of the oil indications.

On making inquiries I found that it was customary to grease the three lowest lengths of rod with a mixture of anti-friction grease and tallow. Approximately 25 pounds of the mixture is consumed per fortnight, and, as the depth of the hole has only increased by 250 feet during the last seven and a half months, it follows that the amount of grease introduced into the hole per foot drilled is 1.5 lbs.

Practically all of this would necessarily be rubbed off in drilling and would eventually find its way into the circulating water and into the sludge pumped out of the hole. The quantity of grease thus added is more than sufficient to account for all the indications of oily matter hitherto recorded, and it appeared to me, threfore, that if it could be shown (1) that greasy sludge collected from the sump at the surface contained either or both of the constituents of the grease employed for lubricating the rods, and (2) that, by treating the mixture of grease and tallow with warm water, oil films similar to those seen on the surface of the lubricating water could be obtained, we would have definite proof of the origin of the oily matter.

To establish the first point, representative samples of the antifriction grease, the tallow and the oily sludge obtained from the bag, already referred to, were submitted for analysis and report to Dr. J. McCrae, Government Analyst. His report on the samples is as follows:

Antifriction Grease (C1906-21).—This material consists largely of mineral oil, but it also contains saponifiable matter; its saponification value is 29.6.

Tallow (C 1907-21).—This tallow has a saponification value of 201.5.

Grease and Sand (C1908-21).—This sample was extracted with ether, and the residue obtained was a dark-coloured (charred) grease of saponification value 141.5. The material extracted is in no way of the nature of natural petorleum; its high saponification value proves definitely that it is not of underground origin. The material was recrystallised from ether, and the crystals obtained, when examined under the microscope, show the characteristic forms of tallow.

There is thus overwhelming proof of the identity of the oily matter contained in the borehole sludge and the material used for greasing the rods.

As regards the second point, it was found that when a mixture of the grease and tallow is warmed with water an oily scum forms on the surface of the water.

That more oily matter should have been in evidence when passing through the gouge filling the fissures is easily explained. The drill naturally went down much faster in this soft material than in the gneiss-granite, and the grease was thus more rapidly rubbed off the rods—in all likelihood also more thoroughly as there would be a tendency for the soft material to pack round the drill.

As regards the origin of gas, the evidence is not so clear. It is, as already indicated, certainly not pure methane, and probably represents a mixture of methane, derived from the carbonaceous "White-Band" shales of the Dwyak Series, which in many localities give off small amounts of that substance, and of a hydrocarbon gas, derived from the cracking or decomposition of the mixture of grease and tallow used for lubricating the rods by heat generated by boring at this great depth.

Grease is a very bad conductor of heat, and as the friction on the bottom and sides of the drill, when at work, must be enormous—the rods weigh over 14 tons—very high temperatures may be generated locally in the film of grease used for lubricating the three lowest lengths of rod.

The actual conditions could not, of course, be reproduced in the laboratory, but Dr. McCrae found that "on heating a mixture of the grease and tallow to a temperature of 300 degrees, the mixture decomposes slightly, yielding some hydrocarbon gas which burns with a luminous flame.

I can only add (Dr. Wagner concludes) that the requisite conditions for the formation and accummulation of petroleum in commercial quantities do not occur in the area under review, and that it would be futile to go on with the hole, as is now suggested, in the hope of striking oil at a still greater depth.

Those responsible for the prosecution of this remarkable enterprise may rest assured that they have done everything humanly possible to realise the expectations they have so long and ardently cherished. The great boring carried to its present depth in the face of almost insuperable difficulties will always be a monument to their energy and perseverance.

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A Menace to the Lead-Mining Industry.

A serious menace to the lead-mining industry is contained in the proposal to prohibit the use of white lead in painting, which is to be submitted to the International Labour Conference, due to be held under the League of Nations, at Geneva, in October next.

A protest has been voiced by the White Lead section of the London Chamber of Commerce in the following terms:—The world's annual production of metallic lead is about 1,100,000 tons, of which 210,000 to 220,000 tons, or 20 per cent., are used for conversion into white lead. The great bulk of the white lead (say 85 per cent.) is used for painting. As zinc oxide is not equal in durability or hiding power to white lead, it may be estimated that some 250,000 tons of spelter (crude zinc) or its equivalent in ore, would be required in substitution for the 210,000 tons or 220,000 tons of lead used to make white lead, if the use of white lead were prohibited for painting.

Deposits of zinc blende (Z.ns.) pure and simple exist only in relatively small quantities and in limited areas; and these deposits do not occur in the British Empire. By far the greater part of blendes used in the making of spelter is produced by working deposits of mixed ores, namely, silver-bearing lead and zinc ores. Such deposits exist in many parts of the world, and especially in Australia and Burma; the Broken Hill Mine in New South Wales produces 150,000 tons of pig lead and zinc blendes (representing approximately 100,000 tons of spelter) yearly, lead ores being the primary product and zinc ores a by-product.

Prohibition of the use of white lead in painting, reducing the demand for lead by nearly 20 per cent., would inevitably cause a great fall in the price of lead; this, it is stated, would have the effect of closing down not only the Broken Hill mines, but also most mines working similar mixed ores. This, again, would affect the supplies of raw material for the production of spelter, and would set up this economic position—a reduction in the world's supply of zinc blende, coinciding with an increased demand for a zinc product, owing to the displacement of white lead for painting by zinc oxide.

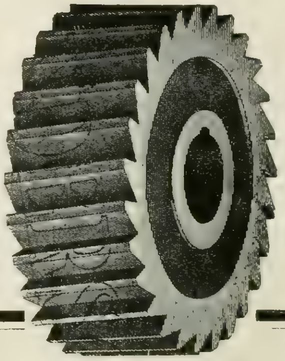
The suggestion has been made in the House of Commons that the British representatives at the Conference should be instructed to ensure that careful consideration be given to the possibility of dealing effectively with the dangers of paint poisoning by precautionary regulations rather than prohibition.

Montrose Exploration.

The Montrose Exploration report states that the balance-sheet as at 30th June, 1920, was prepared for submission to Court in connection with application for reduction of capital, and directors consider that it would be better to submit this and the directors consider it would be better to submit this made up to 31st October, 1920. In view of this it is proposed to prepare next balance-sheet as at 30th June, 1921, so as to bring in alterations necessitated by reduction of capital. Reduction of capital will be effected by payment to shareholders of 2s. 6d. in cash for every share held, allotment of a like sum of Income Debenture stock, and issue of certificates for fully-paid 5s. shares in exchange for present 10s. shares. Balance to credit of profit and loss amounts to £607 for period of eight months, and is carried to balance-sheet. The directors have adopted a policy of reinstating values of properties in South Africa still unsold at reduced book values, obtaining at time of previous reduction of capital, so that figure standing against these properties in balance-sheet has been increased to £26,655, resulting in surplus of £7,336, from which has been deducted debit balance indicated in accounts made up to 31st October, 1919, of £2,340, leaving item described as surplus capital suspense account, of £4,995. At close of period liquid assets and securities, apart from old investments, amounted to £29,712, as against share capital of £51,859.

S.A. Asbestos.

The South African Asbestos Mines, Ltd., is a company with a registered capital of £50,000, of which only £15,000 is held in reserve, the balance being used for development purposes. The company at present employs 7 whites and 250 natives, and has been working for the last twelve months. During the last three months the company has been producing blue crocidolite asbestos in steadily increasing quantities. The estimated output for July is 30 tons, which, at £30 per ton, the present market value, will bring in quite a respectable income. At present only hand labour is being employed, but, when the completion of the erection of machinery has been attained, it is hoped to increase the output tenfold—i.e., 300 tons per month in place of 30. A 50 horse-power suction gas plant, with other machinery, is now being installed, and the company is only awaiting the arrival of machinery imported from overseas to complete the equipment.



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ENGINEERING SECTION.

Wire Ropes Research.

WIRE ROPES FOR USE OVER PULLEYS.

In connection with the investigation now being conducted by the Wire Ropes Research Committee of the Institution of Mechanical Engineers, a useful summary of published data on the subject has been prepared by the reporter to the Committee, Dr. Walter A. Scoble, D.Sc., of Woolwich, which appears in the *Proceedings*.

During the War a considerable amount of experimental work on wire ropes was undertaken, usually to furnish information on special points. The tests were arranged to reproduce practical conditions, and decisions had to be made with a minimum of delay. There was no time for an extensive search of the literature of the subject.

Before commencing the tests for the Wire Ropes Research Committee, a considerable number of papers have been consulted and abstracted, and it has been thought to be desirable to record the results in a Report, showing the present state of knowledge and opinion.

Dr. Scoble observes that the amount of reliable information obtained is disappointing when considered in relation to the number of papers written on the subject. There is an undue amount of repetition, much prejudice, and, where conclusions depend on practical experience, they are often indefinite, usually because they neglect some of the variables involved. There is very little experimental evidence available, and this has probably handicapped the theorists by a lack of data to work upon. Further, it is not at all clear that the subject lends itself to simple theoretical treatment.

The makers of wire ropes frequently specify a factor of safety which depends on the use to which a wire rope is put, and the minimum pulley diameter for each rope. This provides no exact information for the case considered, and none at all if the cable be used on a pulley of different diameter. Other writers, notably American, attempt to place the subject on a better footing by calculating the bending stress and adding it to the tensile stress produced by the load.

It appears that a general method cannot be applied to the design of ropes, as at present made, for use over pulleys. Not only are there insufficient data; entirely different problems present themselves. Thus the outside wear is most important for a rope working on a large pulley, whereas bending fatigue and internal wear do most damage when a small sheave is used. It is possible that generalisation, sometimes unintentional, but caused by the conditions not being clearly stated, has led to some confusion.

The calculation of the bending stress for design does not at present appear to be satisfactory. In the first place there is a lack of agreement on the factor to be used with the Reauleaux formula. There is no rational formula which covers the actual conditions, and the bending stress has not yet been shown to be the determining factor in the destruction of a rope.

It is suggested that an attempt should be made at an analysis which will separate the three destructive effects, namely, outside wear, wear between the wires, and bending fatigue. Their relative importance must depend primarily on the diameter of the pulley, but there are other variables to be considered.

The chemical composition of the steel wire rods seems to be left to the maker and the wire drawer. Considerable variation is met with in American practice.

No distinction is drawn between hardness and tensile strength. They are generally regarded as increasing together. Up to a point it is agreed that wire of higher tensile strength gives a better performance, even over pulleys. Above this point the manufacturers are not inclined to go, and they are supported by some engineers. There is a fear of brittleness and loss of shock resistance. On the other hand, there seem to be no published data to support this view, whereas several experimenters enter a plea for higher tensile wire, and there is a demand for it from many users for certain purposes.

Very little attention has been paid in published matter to the desirability of uniformity of the wire in all respects.

The information concerning the wire diameter indicates a difference of opinion which was not expected. There is the compromise by the use of outside wires of larger diameter.

The question of coating affords a fertile subject for discussion.

Some writers have asked for an adjustment of the lays to suit the diameter of the pulley, but there is no exact information which bears on this point. The balance of opinion favours Lang's lay where it can be used, but the preference is not shown so clearly by American engineers. Nor is there agreement as to the best type of core, although one of fibre is generally advised.

The necessity of a lubricant is universally recognised, as is the fact that it should not be acid, but the best to use under any given set of conditions is not so clear. Further

GOVERNMENT EXAMINATIONS.

METAL MANAGERS EXAM.: Last examination (May, 1921), **15** Metal Certificates were granted in South Africa, and of this number our students secured **10** certificates. Previous examination we secured **7** certificates from **8** entries, and in two other recent examinations **15** passes from **19** entries.

REMARKABLE AND CONSISTENT RESULTS.

COAL MANAGERS EXAM.: Last examination (May, 1921), we secured **3** certificates from **6** entries.

OVERSEAS EXAM.: **21** certificates secured 1920, and **14** certificates to date, 1921.

SURVEY EXAM: We have secured practically **all** the certificates granted by the **Mines Department** during recent years and have obtained **60** certificates to date.

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information which would lead to a closer estimate of when a rope is unsafe, and therefore should be removed, would be very valuable.

The ratio of the pulley to the rope or wire diameter varies considerably for different uses. The adjustment of the mode of construction to this ratio needs further investigation, as does the performance of ropes on pulleys of different diameters. The condition and the lining of pulleys, and the form of the groove, have been the subjects for remarks, but there are few quantitative data.

The effect of different angles of bending of a cable over a pulley appears to be explained very clearly by Leffler, although other opinions are at variance with his conclusion. But the formula he gives to calculate the true radius of curvature of the rope does not agree with that of the Trenton Iron Co.[*]

$$R = \frac{4d^2}{17 \cos o/2} \sqrt{\frac{E}{W}},$$

where R is the actual radius of curvature, o is the angle between the directions of the rope, W is the pull on the individual wires. If R be greater than the radius of the sheave, 2R should be used instead of d. The formula is only valid from 130 to 180 degs. According to the Trenton Iron Co., in most cases for arcs of contact of 45 to 180 degs., the rope is bent to the curvature of the sheave, and there is no difference of bending stress. For slight bends—

$$R = \frac{E d^4 u}{5.25\, t \cos o/2}$$

Where R is the radius of curvature in inches, d is the diameter of the wire, u is the number of wires in the rope, t is the load in lb., and o is the angle of the bend. A table is prepared which gives the theoretical radius of curvature for 1 lb. tension, and to determine the actual radius of curvature, where this exceeds the radius of the sheave, the tabulated radius is divided by the actual tension.

The volume of test results is unfortunately small. The reduction of strength in bending by stranding the wires is worthy of further enquiry, as is Mr. Mallock's suggestion,[†] which might lead to the performance of a rope being predicted from the result of a simple experiment, and so avoid the necessity of a large number of long fatigue tests to fracture.

Mr. Major again brings out the fact which must be well-known to those who have experimented with wire or rope, that false conclusions are likely to be drawn from insufficient data. Wire ropes vary appreciably from point to point, and from rope to rope even when made to the same specification. The first comparison indicates that the fibre-core rope was better than the Lang's lay with solid cores for the strands. The second set makes it appear that the adoption of a soft-wire core improved the Lang's lay rope, but this is not confirmed by the third set of results.

A HARBOUR CUT OUT OF SOLID ROCK.

There is a natural impression that all constructional engineering work of the ordinary kind in Great Britain was suspended during the War, but in point of fact it was found possible to keep quite a number of schemes going in spite of the concentration of effort upon definite war work. A case in point is supplied by an extensive harbour improvement which was begun in Great Britain a month or two before the War. The scheme included a new basin with an area of 2¼ acres and 1,500 feet of new quays. All through the War the work proceeded steadily, if slowly. Its most remarkable feature was that the basin was cut out of solid rock to give an average depth of 13 feet. The material excavated was ingeniously used to reclaim from the sea a considerable tract close to the harbour.

* * * *

AN EASY WAY OF STARTING OIL ENGINES.

To every user of engines driven by crude oil, the process of starting is a nightmare. The blow lamp by means of which the fuel spray is usually given its initial heat, is a device with an almost Satanic cussedness of behaviour. Moreover, its use involves a considerable amount of time as well as trouble. Consequently there ought to be a wide welcome for an ingenious electric heater developed by a leading British firm of oil engine makers. The device is extremely simple. It consists essentially of an electric heating element of high resistance wire placed in the line of action of the oil spray. A small amount of current suffices to make this wire white hot, in which condition it brings the spray rapidly to the temperature required for starting. After the engine has gone ahead the element is withdrawn, so that it is not exposed for more than a minute or so to the high temperature of the combustion chamber—an arrangement which gives it long life and great reliability. The electric current required for operating the heater is supplied by a 4-volt or a 6-volt battery charged from a tiny electric generator, driven through a belt from the engine. By means of this device the engine can be quickly started up from cold without the slightest trouble. Twelve months' trial of the apparatus has shown it to be thoroughly satisfactory.

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The Choice of an Electrical System for the S.A.R.

In view of the recent controversy in the daily Press on the merits as applied to the S.A.R. of the different systems of electrical traction characterised by the different forms in which power is delivered to the trains, the following examination by Messrs. Merz and McLellan, of the advantages and drawbacks of the alternative systems, is of interest.

In a general way it may be said that there are three alternative systems of electric traction characterised by the three different forms in which power is delivered to the locomotives or trains. These are: The direct-current system, the single-phase system, the three-phase system. Each has its own peculiar advantages, which make it specially suitable to meet the requirements of the conditions under which some railways work, and each has been adopted in several cases of electrification on a considerable scale in Europe and in the United States.

The selection of the best system for any particular case is a matter of determining the relative importance of the various advantages of each system as applied to the case in question. To be quite clear, however, it will be best to give a brief description of each system before going on to show to what extent it is particularly suitable or unsuitable for adoption in South Africa.

The Direct-current System.

The special characteristics of the direct-current system is that power in the form of direct-current is distributed to the trains either immediately from generating stations, or from substations in which alternating current is received from a transmission line and converted to direct-current for distribution. Power is distributed to the trains either by a conductor rail supported on insulators fixed to the sleepers, or by means of an overhead wire carried by poles and bracket arms over the centre of the track, and is collected by a suitable device, either collector shoes attached to the axle boxes of the locomotive or an overhead collector fixed on the roof. From the collector, the current is led direct to the main motors through a number of controlling switches. The motors are simple and extremely well adapted to the conditions under which they have to work, being of the variable speed type and capable of exerting any force up to the maximum over a wide range of speed. The control equipment contains no heavy rotating machinery; it consists principally of controlling switches and other simple devices, a small motor generator for auxiliary purposes, and an electrically driven vacuum pump or air compressor. The equipment requires, therefore, practically no attention while in service, and the maintenance cost is low.

The Single-phase System.

The single-phase system in its simplest form consists in the generation, transmission, distribution, and utilisation of single-phase alternating current of low frequency, such as 25 or 15. Thus the substations are very simple and can be spaced at greater distances apart than in the case of the direct-current system. As they contain nothing but static transformers and switch gear, without any rotating machinery, the operating and maintenance costs of the substations are very low. This form of the single-phase system, however, is unsuitable for general adoption in South Africa, where, as already mentioned, it is advisable that power should be generated and transmitted as three-phase alternating current at a frequency of 50. This being so, the only form in which the single-phase system could be adopted is a modification of the simple method, and one resembling the direct-current system. Substations including rotating machinery would have to be erected at infrequent intervals, for example, 40 to 50 miles apart, in which the whole of the power received from the transmission lines would be transformed from three-phase 50 frequency current into single-phase 25 or 15 frequency current for distribution to the trains. Thus under the conditions prevailing in South Africa the principal advantage of the single-phase system, viz., the low substation costs, would have to be largely sacrificed. From the substations power would be distributed to the trains by means of overhead wires at a pressure of 10,000 or 15,000 volts, from which the current would be picked up by the collecting devices on the locomotives or motor coaches.

A Simple System.

In its original form the electrical equipment of the single-phase locomotive was comparatively simple and did not differ very materially from the equipment employed with the direct-current system. The principal difference lay in the special construction of the main motors, the addition of a static transformer for changing the line pressure of 10,000 or 15,000 volts to 300 or 600 volts according to the arrangement of the motors, and in the substitution of a small static transformer for the motor generator provided for auxiliary purposes. The motors themselves have the same general characteristics as the motors of the direct-current equipment, being of the variable speed type, with a wide range of speed and power. It would thus seem that even with the modification made necessary to adapt the single-phase system to South African conditions, this system possesses certain points of superiority over that employing direct-current for distribution and utilisation. Unfortunately, the first cost of the single-phase equipment is much higher than that of the direct-current equipment, and on account of the peculiar design of the main motors and the conditions under which the controlling apparatus has to work, the maintenance cost of the former is considerably greater. Apart from these disadvantages, the system, as modified, would

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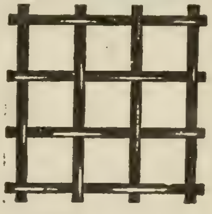
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be a conpenient one for general adoption, as it is well suited to long distance main line working and can be adapted to suburban passenger services, though it is not by any means so suitable for this purpose as the direct-current system.

Appreciation of the disadvantages referred to above has led to the production of a somewhat different type of equipment, on what is known as the "split-phase" system, which is a combination of the single-phase and the three-phase systems. This modification is mentioned below.

The Three-phase System.

In the three-phase system, power is usually generated in the form of three-phase alternating current at a low frequency, generally 25 or 15, is transmitted to transformer substations, and is thence distributed at a suitable pressure to the trains by means of two independent overhead wires over each track. The fact that two wires are necessary is one of the principal drawbacks of this system. Being at different electrical pressures, special precautions have to be taken in designing the distribution system to prevent any possibility of an electrical connection being made between the two wires. This introduces many complications into the design, especially at points and crossings, and particularly in such places as shunting yards. The equipment of the locomotive consists of main motors specially designed for using three-phase current, with the usual accessories for controlling and regulating the operation of these motors. The equipment as a whole is simple, and in fact is generally considered simpler than that on either of the alternative systems. The motors themselves are, however, of the constant speed type, that is they work economically at one or two definite speeds only, and are not intended to work continuously at any other speed. This characteristic is sometimes spoken of as being a great advantage, and under certain conditions, such as those obtaining on mountain railways, this may be true, as it makes for good time-keeping. For a general system, however, suitable for all classes of traffic, viz., suburban passenger traffic, main line goods trains on the level and on hilly sections, long distance passenger trains, and shunting work in marshalling yards, the special characteristic would be a very definite disadvantage.

For the three-phase, as also for the single-phase system, part of the inherent advantage, viz., the simplicity of the substations, would have to be sacrificed in the present case, if our recommendation to generate power at 50 frequency is adopted, as rotating machinery would then be necessary in all substations to convert from 50 to 25 or 15 frequency.

From the foregoing remarks it will be seen that the three-phase system is at a disadvantage in comparison with the single-phase system, by reason of the necessity for erecting two independent wires over every track. On the other hand, the electrical equipments of the locomotives on the single-phase system are costly to instal and expensive to maintain. A combination of the two systems, called the split-phase system, has been brought out recently and put into operation on the Norfolk and Western Railroad, in the United States, which consists of the distribution of single-phase current to locomotives fitted with three-phase equipments. These equipments contain three-phase driving motors of the standard type, and a special device called a "phase divider." This is a very substantial piece of rotating machinery whose function it is to receive single-phase current and deliver three-phase power to the driving motors. Regarded from the point of view of the requirements of a general system for South Africa, the split-phase equipment is no better than the three-phase equipment, as the same type of motor is used in both. The foregoing descriptions will serve to bring out the principal advantages and drawbacks of the alternative systems. There are, however, other considerations which must be taken into account in selecting one of the alternatives for general adoption in South Africa.

(To be Continued.)

Development of Angola.

The British Consul-General at Loanda writes that General Norton de Matos, the newly-appointed High Commissioner for Angola, in his inaugural speech in April last mentioned that the Portuguese Government had authorised the raising of a loan of sixty thousand gold contos to meet expenditure on the proposed developments and improvements of the railways, ports, roads, telegraphs, telephones and other necessary services. Now that a consistent policy appears assured it is expected that within the next few years the railways of the province will be placed on a sound footing, and that the ports will be brought up to date to deal with the increase of traffic which will undoubtedly be forthcoming. The Consul-General points out that a wider field of action is opening in the Colony and that there should be opportunities for British firms to participate in the coming demand for supplies. According to the Lisbon *Jornal do Commercio*, a number of contracts have already been signed for the execution of various public works, including the construction of harbour works at Loanda and Lobito and of quays at Sacco, Bero and Giraul, the extension of branch railways and the consolidation and renovation of existing lines. These development schemes are engaging considerable interest in Lisbon, where the new Governer of Angola is usually looked upon as one of the most capable of Portuguese administrators.

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RESULTS FOR THE JUNE QUARTER—HIGH PERCENTAGE OF PAYABILITY AT RANDFONTEIN—OUTSTANDING FEATURES SUMMARISED.

Reports of the subsidiaries of the Johannesburg Consolidated Investment Company for the quarter ended with June are now to hand, and we give hereunder a summary of the outstanding features of the reports:—

Mine.	Tons Crushed.	Revenue from Gold.
Consolidated Langlaagte	126,900	£198,286
Govt. Gold Mining Areas ...	399,000	843,445
Langlaagte Estates	117,100	191,418
New Primrose	64,000	70,880
New Unified	33,500	40,834
Randfontein Central	373,000	568,514
Van Ryn Deep	150,400	421,380
Witwatersrand Gold	108,700	152,257
Totals	1,372,600	£2,487,012

	Total working costs.	Working costs per ton milled shillings/d. s.	 d.	Gross profit including sundry revenue.
Consolidated Langlaagte ...	£154,775	24	5	£44,438
Govt. Gold Mining Areas...	438,730	22	0	407,010
Langlaagte Estates	157,647	26	11	34,980
New Primrose...	65,129	20	4	6,244
New Unified...	34,485	20	7	6,513
Randfontein Central	517,633	27	9	54,731
Van Ryn Deep	207,852	27	8	217,074
Witwatersrand Gold	133,976	24	8	23,214
Totals and Averages ...	£1,710,327	24	3½	£794,204

Remarks: The value of gold was taken as follows per fine ounce—April, £5 3s. 9d.; May, £5 3s. 9d.; June, £5 7s. 6d.

Consolidated Langlaagte Mines.

The quantity of ore crushed during the quarter amounted to 126,900 tons, an increase of 32,600 tons over the tonnage crushed in the first quarter of the year when the operations were seriously affected by the strike of miners in February. The revenue at 31s. 3d. per ton was 10d. per ton lower than for the preceding three months, but there was a reduction of 2s. 11d. per ton in the working costs, and the working profit for the quarter amounted to £43,521 as compared with £22,234 for the quarter ended 31st March, an increase of £21,287. The development footage sampled totalled 1,824 feet, and gave the following results: Payable, 1,138 feet having an average value of 40.52 dwts. over 16.53 inches of reef. Unpayable, 686 feet, having an average value of 8.11 dwts. over 16.55 inches.

Government Gold Mining Areas.

The quantity of ore crushed during the quarter was 19,000 tons more than during the preceding three months. The revenue was 5d. per ton higher, and the working costs 1d. per ton lower than for the previous quarter, with the result that the working profit amounted to £404,715 as compared with £376,223 for the first quarter of the year. The development footage sampled totalled 3,860 feet, and gave the following results: Payable, 2,070 feet, having an average value of 13.6 dwts. over 53 inches of reef. Reef partly exposed, 140 feet, having an average value of 4.9 dwts. over 44 inches. Unpayable, 1,650 feet, having an average value of 3.1 dwts. over 44 inches.

Langlaagte Estate.

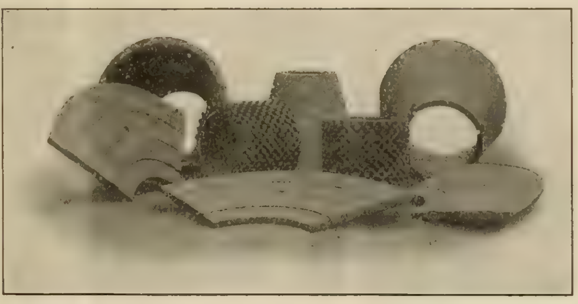
The quantity of ore crushed during the quarter was 11,700 tons more than during the previous three months. The revenue at 32s. 8d. was 5d. per ton higher and the working costs were 1s. per ton lower with the result that the working profit amounted to £33,771 as compared with £23,070 for the first quarter of the year. The development footage sampled totalled 1,735 feet, and gave the following results: Payable, 1,190 feet, having an average value of 22.2 dwts. over 20 inches of reef. Unpayable, 545 feet, having an average value of 7.8 dwts. over 17 inches.

New Primrose.

The quantity of ore crushed was 2,500 tons more than during the preceding 3 months, the revenue was 2d. per ton less but there was a reduction of 4d. per ton in the working costs, with the result that the working profit for the quarter amounted to £5,751 as compared with £5,039 for the first quarter of the year. No development was carried out during the quarter.

New Unified.

The quantity of ore crushed was 2,000 tons more than during the previous quarter, and as there was an increase of 8d. per ton in the revenue and a decrease of 5d. per ton in the working costs, the working profit for the quarter was £2,111 higher than for the first quarter in the year. No development was carried out during the quarter.



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Randfontein Central.

The revenue at 30s. 6d. per ton was 9d. per ton lower than for the previous quarter, but as there was a decrease of 1s. 5d. per ton in the working costs, and as the quantity of ore crushed was 35,500 tons more, the working profit for the quarter amounted to £50,881 as compared with £34,610 for the preceding three months. The development footage sampled totalled 6,030 feet, and gave the following results: Payable, 5,025 feet, having an average value of 26.5 dwts. over 14 inches of reef. Unpayable, 1,005 feet, having an average value of 10.5 dwts. over 16 inches.

Van Ryn Deep.

The quantity of ore crushed during the quarter was 3,200 tons more than during the previous three months. The revenue was 1s. 3d. per ton higher, but the working costs at 27s. 8d. per ton show an increase of 1s. 10d. per ton over the first quarter of the year. This increase is principally due to expenditure incurred in reconditioning both shafts and in connection with the alteration in the method of dealing with the waste rock from the sorting floors and also abnormal expenditure incurred in the purchase of new rock drill machines and steel. The working profit for the quarter was practically the same as for the previous quarter, being £213,528 as compared with £213,429. The development footage sampled totalled 1,230 feet and gave the following results: Payable, 750 feet, having an average value of 19.8 dwts. over 27 inches of reef. Unpayable, 480 feet, having an average value of 4.2 dwts. over 46 inches.

Witwatersrand.

The revenue at 28s. per ton was 1s. 9d. per ton lower than for the previous quarter, but as there was an increase of 16,500 tons in the quantity of ore crushed and a decrease of 2s. 2d. per ton in the working costs, the profit for the quarter amounted to £18,281 as compared with £13,448 for the first quarter of the year. The development footage sampled totalled 1,300 feet, and gave the following results: Payable, 910 feet, having an average value of 14.1 dwts. over 36 inches of reef. Unpayable, 390 feet, having an average value of 5.6 dwts over 32 inches.

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More West Rand Activity.

Private syndicates are taking over the working of some of the mines on the West Rand, where extensive operations have been abandoned, and the Durban-Roodepoort Mining Syndicate, with Mr. Lance, an experienced miner, and Mr. W. Candy, an expert engineer, as the prime movers, has been formed to work the old mining ground and dumps of the Durban-Roodepoort. The other afternoon an interesting function took place, when the Mayor (Mr. N. Toomey), accompanied by the Town Clerk (Mr. A. D. Gowing) and municipal councillors, opened up the new 10-stamp battery, which has been put up.

The Mayor, in breaking the time-honoured bottle of champagne over the mill, tendered warm congratulations to the members of the syndicate upon the initiative and progressive spirit they had displayed in restarting work on an extensive scale on the old Durban-Roodepoort. He had been informed that there was a considerable amount of payable ground in sight, which would provide employment for a number of years, and there was at least six months' work on the dumps, the returns from which were averaging about 8 dwt. It was the intention of the organisers in the future to erect another ten stamps, and the whole work was being carried out by the members of the syndicate. On behalf of the townspeople he could only wish the adventurers the fullest measure of success and they all trusted the result of their operations would bring a new era of prosperity to the district.

A 25 stamp battery, run by a small syndicate, is also at work on the old Princess Estate, and considerable success is attending the operations of the East Champ d'Or Syndicate, near Witpoortje.

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TOTAL RESOURCES OVER - $600.000.000

The Week in the Sharemarket.

GOLD SHARES REMAIN FIRM—DIAMONDS EASIER—BASE METALS DEAD.

The reduction in the bank rate and the gradual resuscitation of industry in Great Britain are the only bright factors of the week cabled from overseas. Otherwise, things on the other side remain much as before. Gold has not altered since last week, when it stood at 114s. 9d., or, if it has, the cables have been silent on the subject. Gold shares remain firm in face of the latest trouble caused by the rift in the good relations between the Chamber of Mines and the unions. The market does not seem to believe in the probability of a strike, or if it does, seems to consider that it may be a blessing in disguise. With the exception of Van Ryn Deeps, all Far East Rand shares maintain their prices—notably the Modder group—but some of the specialities, like Randfonteins, that were on the up-grade, have eased off slightly. Diamonds likewise are quieter and Consolidated Diamonds on Thursday were back to 14s. 3d. Base metal shares are best described as dead; and oils for the moment are also inactive. Coal shares are quiet, and it is noteworthy that the strike ballot includes the white employees on the collieries, which means that the coal industry would be directly affected by a rupture. By this time next week the question will, of course, be settled, one way or another, and, it is to be hoped, for the sake of the country, that moderate counsels will prevail, for strikes, like war, in the last resort, mean waste.

	Fri. 22nd.	Sat. 23rd.	Mon. 25th.	Tues. 26th.	Wed. 27th.	Thur. 28th.
Anglo-Amer. Corp.	21 3*	21 3	20 9	20 6*	20 3*	20 0
Apex Mines	7 0*	6 9*	—	6 9*	—	
Bantjes Cons.	4 9*	4 10*	4 10	4 11	—	4 9*
Brakpan Mines	52 6*	—	52 0	50 0*	—	—
Brick and Potteries.	4 0*	4 0*	—	4 0*		-
Bushveld Tins	0 11†	0 6*	—	0 8	0 8*	0 6
Cassel Coals	35 0*	35 0*	—	—	—	—
City and Subs.	—	—	—		2 0*	2 0*
City Deeps	47 0*	45 0*	47 0*	46 6*	46 6*	46 9
Clydesdale Colls.	26 0*	—	—	—	—	-
Con. Diamonds	15 4½	15 6	15 3	15 3	15 0	14 6*
Con. Investments			—	22 0*	—	-
Con. Langlaagtes	11 3*	11 6*		11 3	11 0*	11 6
Con. Main Reefs	9 6*	9 9*	9 6*	9 7*	9 9*	9 6*
Con. Mines. Select..	14 6*	—	—	—	—	—
Coronation Colls.	40 0*	40 0*	40 0*		40 0*	—
Do. Freeholds	—	0 11*	-	0 11*	0 11*	—
Do. Syndicates	7 3*	8 9	8 9*	7 0	6 9*	6 6*
Crown Diamonds	3 3*	2 9*	3 0	2 11	2 6*	2 10*
Crown Mines		38 0*	—		—	—
Daggafontn. Mines	3 2	3 1*	3 0*	3 3	3 1*	3 1*
E.R. Centrals	-	-			-	5 0*
E.R. Coals	2 1*	—	2 0†	2 3†	—	2 3
E.R. Deeps	0 9*	--	0 6*	0 7*	0 7*	0 7*
E.R. Minings	8 0*	—	8 0*	8 0*	8 0*	-
E.R. Props.	5 0*	5 6†	5 6†	5 3	5 6*	-
E.R. Debentures	£67½*	£68½*				—
Eastern Golds	—	--	0 6*	0 7*	0 6*	0 7*
Frank Smith Dmds.	3 9	3 6*	3 7	3 7	3 6*	3 6*
Geduld Props.	49 9*	49 6*	49 3*	48 9*	48 6†	48 3*
Glencoe Colls.	14 0*	14 0*	14 3*	14 6	—	14 6†
Glynn's Lydenburgs.	8 9†	8 9†		9 3†	7 6†	7 6†
Govt. Areas	78 6*	78 6	78 6	78 6†		77 9
Jupiters	2 0†	1 0*	1 0*	1 9†	—	1 0*
Knight Centrals	3 10*	3 10*	3 10*	3 9*	3 10*	
Knights Deeps	3 6*	3 6*	3 6*	3 6*	3 6*	—
Lace Props.	7 3*	7 3	7 3*	-	7 0*	7 0*

	Fri. 22nd.	Sat. 23rd.	Mon. 25th.	Tues. 26th.	Wed. 27th.	Thur. 28th.
Leeuwpoort Tins	10 6*	10 6†	10 6	10 5†	10 0*	10 0*
Luipaardsvlei Est.	1 9*				—	—
Lydenburg Farms	5 6*	5 6*	5 6*	5 6*	5 6*	5 6*
Meyer and Charltons	—	74 0*	74 0*	—	—	-
Middelvlei Est.			—		1 4*	—
Modder B.'s	27 9	27 6	27 6	27 0	26 6	26 0*
Modder Deeps	43 3	43 9	43 3*	42 6	42 0	42 0*
Modder Easts	11 3	11 9	12 0	11 7½	11 3	11 4½
Hume Pipes	17 6*	17 6*	16 0*	17 0	17 0	17 0†
Natal Navig. Colls.	33 0*	36 0†	35 9†	35 9†	35 6†	—
New Eland Dmds.		22 0*	20 3*	20 3*	20 0*	20 0*
New Era Cons.	7 6	7 4*	7 6	7 3	7 3*	7 3
New Geduld Deeps.	1 4*	1 6	1 4*	1 4*	1 4*	1 4*
New Kleinfonteins	6 0	5 8*	5 6*	5 3*	5 6*	5 3*
New Modders	67 0	67 0	67 0	66 9	66 3	66 6*
Nourse Mines	7 0	6 9*	7 0*	—	—	—
Pretoria Cements	49 0a	49 3	49 0*	48 0*	47 6*	48 0*
Princess Estates	1 1†	0 11*	1 0*	1 0*	1 0*	0 11*
Rand Collieries	1 3†	—	1 0	—	1 0*	1 0†
Rand Nucleus	1 0	1 0*	1 1*	1 0*	-	1 0*
Randftn. Cen. Dps..	10 6	10 6*	10 6*	10 0*	10 0*	10 6*
Randftn. Estates.	16 6	17 3	17 0	16 9	16 3	16 3*
Roberts Victors	9 6	9 0*	—	—	—	9 6†
Rooibergs	4 3	4 0*	4 0*	—	4 3*	4 3*
S.A. Lands	4 3*	4 4	4 3*	4 3	4 1*	—
Springs Mines	38 6	38 0*	38 3	37 6	36 6	36 6
Sub-Nigels	11 6*	11 3	11 3	11 3*	11 0	10 10*
Swaziland Tins	10 0†	10 0†	—	—	—	10 0†
Transvaal Lands	17 0*	17 0*	17 0*	17 0*		—
Van Ryn Deeps	69 3	69 6	69 0†	68 9†	67 9†	66 6*
Village Deeps	7 0	7 9*	7 0*	—	—	—
West Rand Cons.	-	2 6†	2 6†	2 6†	—	2 6†
Western Rand Est.	3 9*	5 0	4 8	4 0*	3 9*	3 9*
Witbank Collieries	45 6†	—	44 0	-	—	42 6*
Witwatersrands	11 0†	—	-	—	—	—
Wit. Deeps	7 9*	—	—	8 0	7 6*	8 0
Wolhuters	3 0*	3 9*	4 0†	3 9*	4 0†	3 9*
Zaaiplaats Tins	3 3*	3 3	3 3*	3 5*	3 3*	3 3*
Union 5 per cent	£98½*	£98½*	£98*	£98½	£98¼	£98½*
New States	24 0†	24 3†	23 6*	23 6	-	--
Rouxvilles	2 0	2 0	1 0*	1 10	1 8*	1 8*
South Van Ryns	3 0†	2 3*	2 6	—	3 0†	—
S.A. Townships	11 0	11 0	11 0*	11 0*	11 0	—
S.A. Alkali	15 0*	15 3*	15 3*	15 3	—	16 0
Transvaal Silvers	27 6	27 0*	27 3*	26 6*	25 9	26 0*
West Springs	12 0*	12 3*	11 9*	11 6	10 9*	11 0*

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ENGINEERING JOURNAL.

WHITE WAGE INCREASES.

In our last issue we quoted Mr. Marriott as stating that the increase in white wages on the mines of the Central Mining and Rand Mines Group showed an average increase of 92 per cent. on pre-war figures. This figure is substantially confirmed by some statistics from the actual records of a mine taken at random. Comparing the wages paid in May, 1914, with those paid in May, 1921, the following figures are instructive:

Tons milled: May, 1921, 46,000; May, 1914, 52,500.

Mechanics in workshops (excluding apprentices): May, 1921, £38 16s. 5d.; May, 1914, £25 3s. 11d.; increase, 54 per cent.

Surface engine drivers: May, 1921, £42 13s. 10d.; May, 1914, £28 2s. 5d.; increase, 51.8 per cent.

Banksmen: May, 1921, £34 9s. 11d.; May, 1914, £20 12s. 9d.; increase, 67 per cent.

Reduction workers: May, 1921, £35 14s. 7d.; May, 1914, £20 6s. 8d.; increase, 75.7 per cent.

All surface employes (including apprentices): May, 1921, £34 7s. 10d.; May, 1914, £20 2s. 7d.; increase, 70.9 per cent.

Developers (machine): May, 1921, £67 16s. 10d.; May, 1914, £44 3s. 4d.; increase, 53.6 per cent.

Machine stoping: May, 1921, £64 16s. 10d.; May, 1914, £56 7s. 10d.; increase, 15 per cent.

Shaft timbermen: May, 1921, £42 15s. 1d.; May, 1914, £27 18s. 3d.; increase, 53 per cent.

Engine drivers (underground): May, 1921, £42 11s. 4d.; May, 1914, £27 14s.; increase, 53.7 per cent.

Day's pay hammers: May, 1921, £38 0s. 11d.; May, 1914, £23 12s.; increase, 61 per cent.

Pipemen: May, 1921, £35 16s. 7d.; May, 1914, £18 9s. 10d.; increase, 93.8 per cent.

Men in charge of pumps: May, 1921, £37 2s. 11d.; May, 1914, £23 15s. 11d.; increase, 56 per cent.

Timbering and rockwalling: May, 1921, £35 11s. 1d.; May, 1914, £17 7s. 1d.; increase, 104.9 per cent.

Pipefitters: May, 1921, £35 1s. 1d.; May, 1914, £26; increase, 34.8 per cent.

Skipmen and onsetters: May, 1921, £33 4s. 11d.; May, 1914, £19 13s. 5d.; increase 69 per cent.

Tramming and shovelling: May, 1921, £33 1s. 10d.; May, 1914, £20 6s. 11d.; increase, 62.6 per cent.

Total underground: May, 1921, £45 2s. 9d.; May, 1914, £24 16s. 5d.; increase, 81 per cent.

Total employes—surface and underground: May, 1921, £41 12s. 5d.; May, 1914, £22 14s. 1d.; increase, 83 per cent.

AN ALL-OIL NAVY.

Naval experts and shipbuilders in all parts of the world have been much impressed by the decision of the British Admiralty to build only oil-burning ships in future. Many reasons have combined to bring about this decision. Among them are the convenience of transporting oil and storing it at strategic points, the small space which it occupies on board ship, the ease with which oil may be taken on board ship from tanks or tank steamers, the simplification of stoking, and the high efficiency of the fuel. It is calculated that even at present prices oil is cheaper than coal as a fuel, apart from the other economies enumerated. This official decision is likely to give a fillip to the movement, already taking place rapidly, for the conversion of large liners and other merchant vessels flying the British flag from coal-firing to oil-firing. One benefit of the change will be to do away with the terrible conditions to which stokers on coal-fired ships are subjected, especially on tropical seas. On humanitarian grounds alone the example of British enterprise in this direction is worthy of world-wide adoption.

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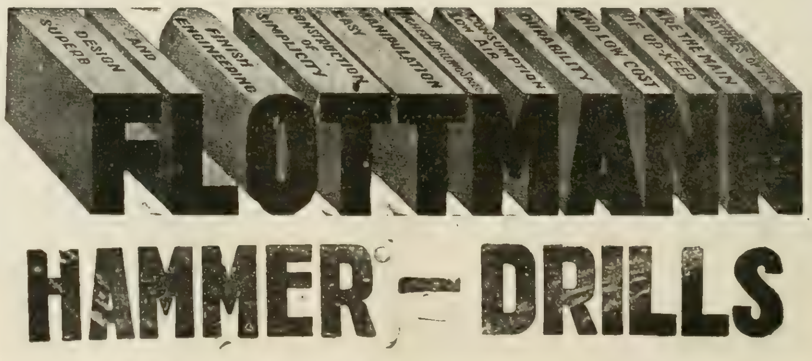

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS STILL SLOW—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—MINERS' WAGES—FINANCIAL— CONTINENTAL COMPETITION—METAL MARKET.

General Position.

There is no improvement to report this week in business conditions, which have ruled exceedingly quiet. On the Commercial Exchange realisations of stocks at below replacement values have not ceased and have helped to depress things considerably. With regard to miners' wages the view generally held in commercial circles is that the men will have to look at facts in the right light and agree to a reduction. Undoubtedly a lot of work in the shape of development is being held back to-day for a drop in working costs per ton. At the moment things are not looking too promising in that direction, but should the miners agree to the Chamber of Mines' terms signs are apparent that, with the approaching depletion of mines' stocks—their reserves, it is thought, are now round about the zero position—a betterment in trading conditions is not far distant.

Iron and Steel.

Business during the past week was inactive; transactions on the Commercial Exchange showed a continuance of sales at prices below replacement values. The general tendency is for heavy mining material to hold its own, while for timber prices are a trifle easier.

Latest quotations:—Dunswart, 29s.; Union Steel Corp., Ltd., ordinary sized rounds, flats and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 49s. 6d.; ⅜ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 49s. 6d. to 62s.; ¼ in. square iron, 55s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. to 62s. 6d.; channels and joists, 47s. to 48s.; imported angles, 45s. to 47s.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in., ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 57s. 6d.; ⅝ in., 55s. per 100 lbs.; per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. to 57s.; shovels, 60s. to 65s.; wheelbarrows, 57s. 6d. to 60s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d. per 98 lb. coils; 24s. to 25s. per 68 lb. coils, large, 12 gauge, 28s. 6d. per 96 lb. coil; 14 gauge, 22s. 6d. per 66 lb. coil; plain wire, No. 8 galvanised, 35s., and black 32s. 6d. per 100 lb. coil.; fencing standards, 12, 14, and 16 lb., at 27s. 6d., 30s. and 32s. 6d. respectively per dozen; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb.; steel plates, about £33 to £35. Cast steel is £50 per ton; mild steel, £19 per ton.

As will be noticed from our advertising columns, the African Iron and Steel Products Co., Ltd., has given its management into the capable hands of Mr. Maurice Brown, of Johannesburg.

Engineering Shops.

The weekly canvass of these discloses that this has been a fairly good month, with a very good tail, but until August engineering works will not know exactly how things are going to shape in the immediate future. The miners' action in respect of the Chamber of Mines' decision as to a reduction in wages is already casting a shadow before. Engineers as a whole think that the P.W.D. and other Government departments should, in the interests of the men themselves, take a more decided attitude in regard to wage questions, and thus keep matters within certain boundaries.

Timber and Building Materials.

Business is still very slow in the absence of any extensive building operations. Quotations: 3 x 9 deals, 1s. 1d. to 1s. 2d.; scantlings, 1s.; beaver board, 5d.; oregon, 8s. to 9s.; pitch pine, 9s. to 9s. 6d. The price of the latter is expected to be cheaper within a few weeks. Floorings, 7d. to 7½d.; ceilings, 5d. to 5½d.; corrugated iron, 24 gauge, 9½d. to 11d. Furniture timber: Burmah teak, 18s. 6d. delivered; American oak, 1 in. to 3 in., 1s. 6d. per super; American black walnut, 1 in. to 4 in., 1s. 6d. per super; West African mahogany, 27s. per cube at coast; Japanese oak, 15s. 6d. per cube. Bricks are 70s. for blue stock, 60s. for mixed, £4 10s. to £5 for wire cuts, and £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 7s. 6d.; cement, 11s. 6d. per bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 46s.; 3-ply, 55s.

Blue Building and Plastering Lime.

Trade under this head has been fairly well maintained, considering the bad state of business generally. Prices have fallen somewhat, and blue building lime is now selling at 3s. 9d. per bag and plaster lime at 4s. 9d. per bag.

All the responsible producers have come to an arrangement with merchants of standing to distribute their products only. This has been done in the interests of the trade generally, as some unscrupulous merchants have been selling lime purporting to be well known makes, whilst it has been a far inferior grade of lime, consisting for the most part of ash and unburnt stone. Progressive factories have furthermore taken the precaution to have their bags branded with their name on in a similar manner to that of the cement companies, to prevent further frauds.

Building generally throughout the country has eased off somewhat. There seems to be a tendency on the part of the public to wait for things to get more or less down to a lower level before building again.

Second-hand Iron and Timber Yards.

Business during the past week has been somewhat better, but not to any great extent. Second-hand iron is now ruling at from 5d. to 7d., and timber at 11d. to 1s. Stocks are plentiful.

Electrical Goods.

Trading in town and country remains pretty much the same; little activity is being shown generally, and, apart from the usual repair work there is not much life in this section. Nor does the acknowledged inadequacy of the present power station, together with the very subdued scale of operations in the building trade, justify any promised improvement in the immediate future. As regards prices, in view of an iminent arrival of lamps, these are declining, and the price has already gone down about 10 per cent. Other lines remain without quotable change. Electrical wares from Britain are arriving steadily, with no present alteration in prices, but the tendency in consequence of the termination of the coal strike is towards lower levels, which may be felt, it is thought, sometime next month. Continental goods show no material change, but are, as previously pointed out, coming on to our market at prices much below British prices.

Miners' Wages.

With the apparent desire on the part of the Chamber of Mines not to dislocate the industry by the imposition of reduced wages too harshly, it would appear that both sides are now on the eve of important decisions. The present ballot is awaited with the greatest interest. The consensus of opinion in mining circles is that the common sense of the miners will prevail over such an ephemeral occurrence as the temporary rise in the price of gold. In the opinion of a very prominent broker, should the miners, against expectations, refuse the Chamber's proposals, such action would throw us back tremendously and, he thought, put us practically into the position of Britain during the recent coal struggle.

Financial.

The reduction of the Bank of England rate to 5½ per cent. has been well received here.

British Finance and Trade Conditions.

According to a White Paper issued last month by the British Treasury, Britain owes the United States about £975,000,000, the adjustment of which, together with the per contra amounts owing to Britain by the Continent, is holding off that stabilisation of general trade so much needed. Last year Britain's imports decreased by about 10½ million tons weight as compared with 1913, her exports by 52,000,000 tons. The report states that the coal export fell from 76,000,000 in 1913 to 28,000,000 in 1920; in other words, British exports decreased during the first five months of 1921 by no less an amount than 33 1-3 per cent. compared with the corresponding period of 1913. This decline in exports was reflected in trade unemployment percentage, which meant an increase from the year before the War of about 2 per cent. to 6 per cent., rising when the coal stoppage occurred to over 17 per cent. in April, and 22.2 per cent. in May. The full effects of the coal strike have yet to be felt, and anticipations of any immediate trade revival are not too hopeful.

Germany's Recovery in World's Trade.

All recent reports from Germany confirm the impression that she is recovering very quickly from the recent catastrophe and is making a determined effort, apparently not unsuccessfully, to regain her world's trade. The German workers are working in earnest, while in Britain it remains to be seen whether, after the recent dislocation, the old times will come up to the scratch and succeed in regaining their former supremacy. Continental competition with Britain is causing great concern. During the coal strike the undercutting of the Continent could be allowed for, but now we shall have to buckle to to compete with these foreign rivals, whose prices are much below ours. Belgian mild steel has been quoted outwards at about £14 per ton, spring steel at about £18 c.i.f.; whereas British spring steel cannot be supplied at less than £35 per ton. The cost of labour, of course, is the basis of the trouble, and until wages come down no determined opposition can be made to our foreign rivals.

America's Shipping Losses.

In common with other Governments, America finds that the running of a mercantile service is a mistake. During the War this was, of course, necessary, but now the American Shipping Board finds itself faced with a loss of about £500,000,000 on its venture.

Oil.

The damage caused by the fire of the Amatillan oilfields is incalculable, and is a severe setback to a market not too well supplied.

Metal Market.

Latest quotations: Copper £70 8s. 9d. per ton for cash, £70 18s. 9d. forward; electrolytic copper £74 10s. cash, £75 10s. forward; Straits tin £161 2s. 6d. cash, £163 2s. 6d. forward; English lead £24 2s. 6d. cash, £23 12s. 6d. forward; silver 38d. per oz.; gold 114s. 11d. per oz.

The death has taken place at Tete, on the Zambesi, from blackwater fever, of Mr. F. Zabel, geologist to the Zambesi Mining Development Company. Deceased, who was born in Australia, occupied high positions in Canada as a geologist of note, and on the outbreak of war he was engaged in surveying manganese steel deposits in Germany, where he was arrested and held prisoner until the declaration of the armistice.

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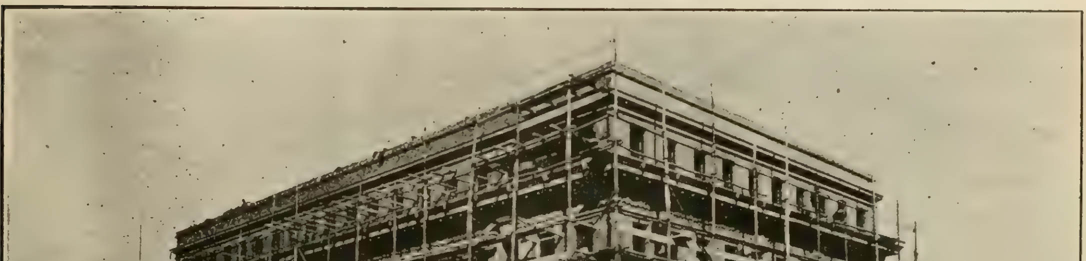
Read "What's Wrong with the Rand?" in this Issue

The South African
Mining & Engineering Journal
THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.
Established 1891.

Vol. XXXII., Part I JOHANNESBURG, TRANSVAAL, SATURDAY, AUGUST 6, 1921. No. 1558.

The New Home of the Industry—Chamber of Mines Building Nearing Completion.



The accompanying photograph, which was specially taken for the Journal a few days ago, exhibits the new building of the Transvaal Chamber of Mines. A critical article on the subject of the necessity that exists for reducing working costs, the "Sanhedrin" of the industry, and the administration of Witwatersrand Mines generally, appears in this issue.

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Telegrams: "SIEMENS."

WHAT'S WRONG WITH THE RAND?

EMPLOYERS AND EMPLOYEES CRITICISED—THE CHAMBER'S MODEST WAGE-REDUCING PROPOSALS—WHAT THE PEACE-AT-ANY-PRICE POLICY HAS COST—SOME ARRESTING FACTS AND FIGURES GRAPHICALLY DISPLAYED—NECESSITY FOR ATTRACTING CAPITAL—LESS COST AND BETTER SERVICE REQUIRED—REFORM NEEDED IN THE HEAD OFFICES AS WELL AS ON THE MINES.

The industrial outlook on the Rand, which was far from satisfactory when our last issue went to press, looks considerably brighter at the moment of writing. It will be recalled that after long and tedious discussions, conferences, and exchanges of letters lasting over a period of more than two months the Chamber of Mines at last announced its intention of enforcing a reduction in wages of 1s. 6d. per shift in respect of all workers whose rates of pay are not stabilised until later on in the year. This 1s. 6d. per shift is just half the amount of the reduction announced by the Chamber originally, and many outside and impartial observers have deplored the fact that the industry's council of the wise men

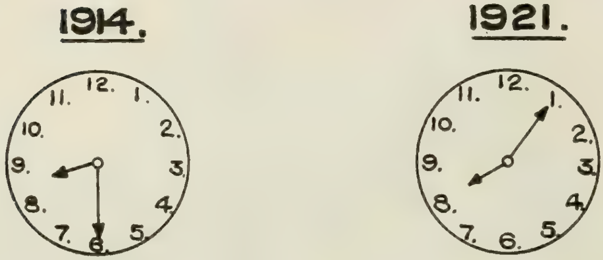
"The Corner House," Johannesburg's most imposing Building, and Headquarters of the Premier Mining Corporation of South Africa.

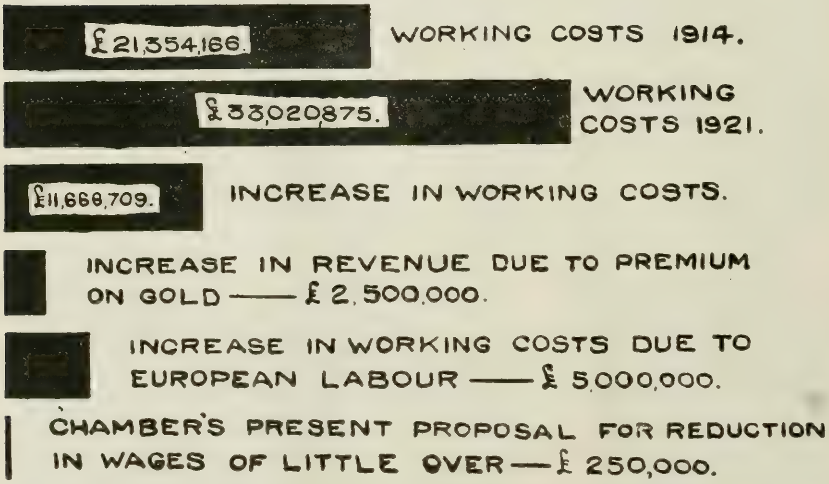
SOME FACTS AND FIGURES SHOWING THE RELATION BETWEEN WORKING HOURS AND COSTS DURING YEARS

1914 AND 1921

ON THE RAND.

WORKING HOURS PER DAY.





The above diagram shows that on the Chamber's published figures there has been a decrease in the working time of 25 minutes per day. The two clock faces depict the working hours in the two comparative years. In order to clarify the argument, the shift is supposed in each case to commence at 12 o'clock. The 1914 clock shows that the men knocked off at 8.30, whereas in 1921 the shift was finished at 8.5. The next three horizontal columns exhibit in graphic form the tremendous increase that has taken place in working costs during the past seven years. As against this, relief due to the "premium" has averaged no more than two and a half millions per annum when spread over the 1914-1921 period. Increases in working costs due to European labour on the other hand, by which is meant increased wages, additional amounts in respect of phthisis, and holiday leave, have amounted to double the annual increase in revenue on account of the gold premium. European labour on the Rand now in fact absorbs five millions sterling per annum more than it did in 1914. The diagram is drawn strictly to scale and the last item appearing above makes it quite clear that the Chamber's present proposal for a reduction is well nigh infinitesimal by comparison with the immense increases paid by the industry in respect of white labour.

did not stand firm on its first position, for which there was ample justification. The men's leaders, however, recommended the Unions to resist the reduction, and for the past few days a strike ballot has been proceeding.

An extraordinary feature of this ballot has been that the coal miners have been asked to register their approval or disapproval of "downing tools," although there has been no suggestion whatsoever of tampering with the wages of the colliers.

The Door Not Barred.

As we have already stated, however, the outlook at present is considered to be materially brighter. Although it is generally anticipated that the ballot will favour a strike, this will not necessarily imply that an order to "lay off" will be issued by the Unions. It will, of course, give to the men's leaders a mandate and an instrument for bargaining. But it seems highly probable that the bludgeon will not be used by the Federation. Further conferences have been proceeding, and although at the end of last week it looked as if the door had been locked and bolted against further negotiations, the general belief now is that a way will be found out of the *impasse*.

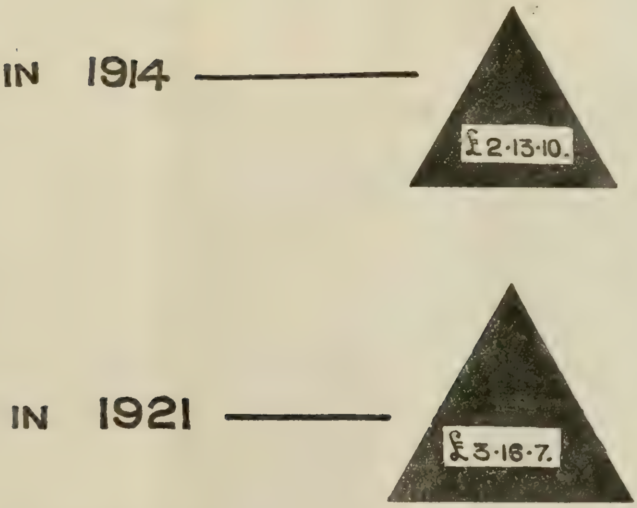
The Peace-at-any-Price Policy.

Neither side, it appears, is desirous of a fight, but whatever the result of the further bargainings will be it is to be ardently hoped that the Chamber of Mines will not continue in its policy of peace-at-any-price and "damn the consequences." According to advices from London, it was believed on the other side that Sir Evelyn Wallers was returning to South Africa armed with full powers from the Rand's overseas landlords to infuse a stiffening attitude in the policy of the industry with regard to white labour. It remains to be seen how far such a line of procedure will be adopted; everybody realises that it is badly needed.

Sir Lionel Returning.

In this connection, it is interesting to note that Sir Lionel Phillips has left England for South Africa, and we have no doubt that Sir Lionel's return to the Union is not uncon-

COST OF PRODUCING ONE OUNCE OF RAND GOLD



This diagram, which has been drawn strictly to scale, exhibits in striking form the greatly increased cost of producing an ounce of gold to-day and in 1914. The lower triangle shows that at the present day the expenses entailed in respect of marketing one ounce are £3 16s. 7d., a figure which leaves very little margin of profit with gold at standard value. The figures are in respect of June operations in each year.

nected with the general industrial situation in the country where he has so many vast interests. We shall welcome his visit, for the industry is without a real and virile leader on the spot at the present time. There seems to be no one in the higher local councils of the Big Houses invested with some of the fighting spirit of the late Sir George Farrar—no one who will go along the Reef and talk and appeal straightforwardly to the men, and who is prepared to accept their challenge if they prefer a conflict to reason.

The Chamber's Propaganda.

In this particular dispute the Chamber has apparently sought for much from public sympathy and understanding. The Chamber has deluged the Rand with huge propaganda statements in the Daily Press. These clearly show how reasonable is the proposal now put forward to effect a much-needed reduction in working costs, and they also clearly reflect how enormously wages have risen in the past seven years, and how closely to ruin the pursuance of the peace-at-any-price policy has brought the industry.

Some of the Chamber's propaganda has been very well expressed, but the full-page statistical advertisements have not tended to clarify the facts in the eyes of the man in the street, whose favour the Chamber evidently desires. Many a reader on the trams on opening his news-sheet has passed over the big display page of the Chamber, thinking that it is the advertisement of some enterprising toilet supply company.

Some Valuable Diagrams.

To our way of thinking, a series of graphic diagrams, such as are given herewith, would have brought the arrestng facts of the situation out more clearly.

The charts here reproduced exhibit in graphic form the decrease in working hours, the immense increase in working costs, and particularly in regard to European labour, the smallness of the Chamber's present wage-cutting proposals, and the all-important fact that whereas in 1914 it cost £2 13s. 10d. to produce an ounce of Rand gold it costs to-day £3 16s. 7d.

The Chamber's Case.

The Chamber of Mines in one of its statements points out that in 1914, £7,140,000 were paid to Europeans in wages and salaries; in 1920, £11,350,000 were paid.

In 1914, holiday provileges for white workers cost the industry £27,000; in 1920, over £600,000.

In 1914, phthisis contributions cost the mines £580,000 and the men £73,500; in 1920, they cost the mines £800,000 and the men nothing.

Other items bring up the total additional cost per annum of white workers to the industry to more than five millions per annum.

The Chamber is now asking for a reduction of about £250,000 per annum, *i.e.*, about one-twentieth of the additional cost.

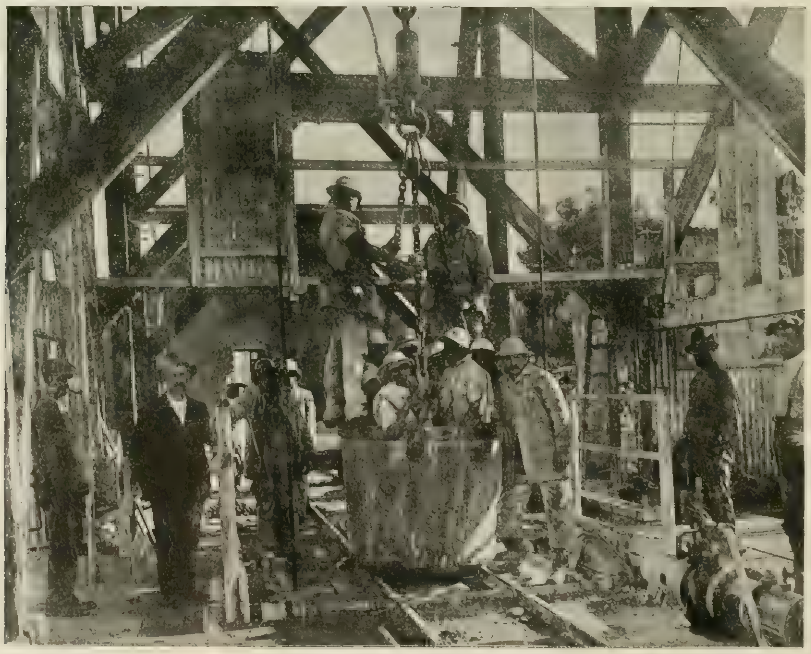
Wages at a Typical Mine.

The Chamber has also published lengthy statements of wages on the Durban Deep, Van Ryn Deep and Village Deep, and we hereunder give a summary in respect of the last-named property. The masses of figures as published in the Daily Press are in our opinion only calculated to bewilder the ordinary reader, and the following abstract crystallises the essential facts in regard to wages at the Rand's deepest mine and shows how enormously rates of pay have advanced.

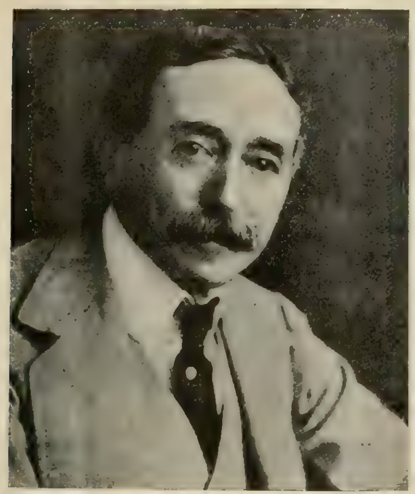
Statement of Wages (other than Officials).

We give hereunder a summarised statement of wages (other than officials), including overtime, earned in May, 1921, and comparison of average monthly sarnings with May, 1914, of all men employed underground and on the surface, excluding mechanics, at the Village Deep:—

FIGURES IN THE PRESENT WAGES DISPUTE—THE MEN.

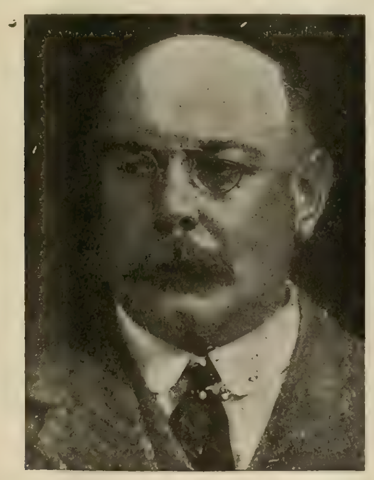


Rand mine workers at the Shaft Head. European supervisors on the Rand draw higher pay for the amount of work they do than do miners on any other field in the world.

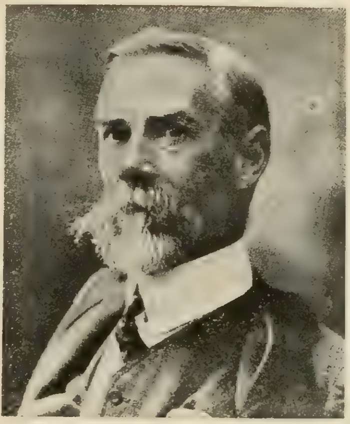


Sir Lionel Phillips, Bart., Head of the Corner House, who is now returning to South Africa.

Professor J. G. Lawn, local head of the J.C.I. Barnato Group.



Sir Wm. Dalrymple, K.B.E., Joint Vice-President of the Chamber.



Mr. Samuel Evans, Chairman and Managing Director of the Crown Mines and a Vice-President of the Chamber.

Mr. H. O. Buckle, President of the Transvaal Chamber of Mines.

Sir Evelyn Wallers, K.B.E., of the Corner House, a former President of the Transvaal Chamber of Mines.

—AND SOME OF THE MAGNATES.

Village Deep Limited.

	Average earnings per man per 26 shifts.		
Underground.	May, 1914.	May, 1921.	% Inc.
Shaft Sinking	None employed	£131 18 3	—
Machine Developing (Contract)	£44 3 4	67 16 10	53.6
Machine Stoping ...	34 7 8	64 16 10	88.6
Hand Stoping	23 12 0	38 0 11	61.2
Reclaiming	25 16 4	38 1 8	47.5
Shaft Timbering ...	27 18 3	42 15 1	53.2
Timbering and Stone-walling	17 7 1	35 11 1	104.9
Tramming and Shovelling	20 6 11	33 1 10	62.6
Winch Ateendants ...	12 14 5	29 17 7	134.9
Skipmen & Onsetters	19 13 5	33 4 11	69.0
Engine - Drivers (Underground) ...	27 14 0	42 11 4	53.7
Platelaying	25 0 4	35 18 4	43.6
Pipefitting & Water Service	21 12 3	35 4 3	63.0
Pumping	23 15 11	37 2 11	56.1
Sanitation	23 8 0	29 18 0	27.0
Drill Collectors	16 5 0	34 2 3	109.9
Surface:			
Milling	20 12 2	39 6 3	90.8
Cyaniding	19 14 3	33 5 7	68.3
Crushing	23 16 8	36 8 0	52.7
Engine-Driving	28 2 5	42 13 10	51.8
Banksmen	20 12 9	34 9 11	67.1
Sundries	18 4 11	31 0 9	70.0

To Attract Capital.

Quite apart from the necessity—the urgent necessity—which exists for a reduction of working costs from the point of view of enabling existing mines, and particularly low-grade ventures, to continue operations on a stable and non-fluctuating basis, there is the need for attracting more capital to these fields for the prosecution of further development. Reduction of expenditure and improvement of efficiency are absolutely essential if the Rand is again going to attract capital in sufficiently large volume to enable the vast eastern and western annexes of the old and declining central sections to be developed. Probably not less than twenty millions of money will re required during the next few years to bring the great claim areas which lie to the south and south-east of Daggafontein and to the south and south-west of Randfontein, to the productive stage, and if such a sum is nòt obtained one can quite easily foresee the waning of the Witwatersrand Goldfields to such a degree that the Rand's production will decline to that of the level of Southern Rhodesia or Mysore or the Western States of America, with a consequent great contraction of the prosperity and status of Johannesburg and a terrible diminution in the revenue of South Africa. For these reasons, then, if for no other, it is imperative that the cost of producing an ounce of Rand gold should be very sensibly curtailed, and in our estimate this curtailment will have to go considerably further than the 1s. 6d. per shift reduction proposed by the Chamber in respect of certain of its employees, which is a proposition which means no more than a miserable quarter of a million per annum.

Better Service and Less Cost Required.

More efficient service is required of *all* the employees of the industry, and when we say all employees we do not exclude the great head office establishments, and particularly the non-technical administrators of the industry. We thoroughly agree with the view that a reduction of 1s. 6d. per shift in the pay of Rand miners is mere economic righteousness. We would indeed go further than this, and we contend that if the original proposal of the Chamber to reduce wages by 3s. per shift had been adhered to the cut would not have been unjust, having regard to the fact that the average mine-worker on these fields is only a supervisor—and a bad one at that and that the real backbone of the industry is the native worker, who by virtue of a strange instrument of injustice termed the Colour Bar is, in this Socialistic Transvaal of ours forbidden to earn more than a mere fraction of what his Red Flag " brethren " receive. There can be no doubt that white labour on these fields obtains more than its rightful earnings except in a comparatively few cases, and there can, too, be no question about it; the average non-technical Director of the Witwatersrand Mining Industry receives very much more than he is worth. But for a combination of circumstances exceedingly fortunate for the average non-technical administrator, such as relationship, favouritism, social standing, or the sentiment which clings to an employee because he started licking stamps in the very office which he now directs, few of these men would hold positions of trust and responsibility to-day.

Pusillanimous Proteges Not Wanted.

It is our conviction that if the Rand is to regain much of its former measure of industrial prosperity and is to attract large volumes of overseas capital for further development, a big and sweeping change will have to be made in the head office administrations, and men of ability, technical knowledge, foresight, imagination and courage will have to take the places of the pusillanimous protégés who have for the past few years misdirected our mines. It has been said by some that the recent criticisms of the non-technical administration of the mines which have appeared in this paper are not constructive. But our critics overlook the fact that sound construction cannot commence until destruction has cleared the ground, removed the withered leaves and brushed aside the debris which encumbers the earth upon which a new industrial structure may be reared. We observe the new Chamber of Mines building is now nearing completion, and a photograph of the edifice appears as a frontispiece of this issue. It is our fervent hope that the completion of this new home of the headquarters of the industry may be happily symbolic of a fresh start on the Rand and of a new epoch in which sane and strong administration will take the place of the era of blunders which has characterised Witwatersrand mining administration during the past few years.

Congo Copper.

A London cable published last week stated that at a meeting of shareholders of the Union Miniere du Haut Katanga, held at Brussels, it was stated that the gross working profits for the year were nearly ten million francs; that the year had been a difficult one, but the future was bright: and that it was proposed to raise 200 million francs over a period of six years. A London paper received by the mail states that the object of the issue is to enable the Union Miniere to undertake the construction and development of the La Panda hydro-electrical works with a view to the production of 100,000 tons of copper per annum. It is stated that the original proposal was to float a subsidiary company for the purpose in view, but that the company have been unable to obtain the requisite authority, and have accordingly decided to carry through the undertaking themselves.

Eileen Alannah.

The report of Eileen Alannah Mining Company for 1920 states that 21,720 tons were crushed, giving yield of £26,476. Accumulated slimes were let on tribute producing royalty of £131. After providing for development redemption and depreciation, the year's working shows loss of £1,950, plus loss brought forward, making total debit £25,816. In February, 1921, very heavy rains occurred over the district, with the result that at the end of the month the mine was flooded to within 50 feet of the surface. The latest report from the mine is conveyed in a report from Mr. Gardiner, dated 29th April, 1921, in which he states that the principal difficulty is in getting the mine de-watered. He had hoped that by this time they could have been getting a good value oxidised ore from the open cut, but the amount of water does not diminish and although three steam pumps have been working night and day the water is going down very slowly, despite the fact that over 750,000 gallons per day are being pumped. At the time of his visit the water was standing about 50 feet down from the surface, and was going down at the rate of about a foot a day, at which rate it would mean another 50 days to get it to the 100 ft. level.

The Great "Mauritian" Collieries.

THE ROUILLARD ENTERPRISES IN THE VRYHEID DISTRICT—FULLY DESCRIBED IN OUR SECOND COAL NUMBER—A VALUABLE ABSTRACT OF INFORMATION FOR INVESTORS.

In the second Special Coal Number of the *S.A. Mining and Engineering Journal*, which is now on sale at the very modest price of 5s. per copy, the various collieries of the Union and Rhodesia are dealt with individually and in detail, and quite apart from the value of this important section of the Special Number from the point of view of the general trade aspects of the various concerns the data contained in the publication will be found specially useful to investors in coal mining concerns, since the assets, finances, and dividends, etc., of the companies are most carefully and thoroughly examined. A considerable amount of space is devoted in this number to the progressive and well-managed collieries in the Vryheid District, which are known as the Mauritian group, and which, largely through the foresight and ability of Mr. R. A. Rouillard, and the astute backing of Mr. Stafford Mayer and Island capitalists, have attained to a position of prosperity and general soundness which is not exceeded by any other colliery enterprise in South Africa.

The three mines, Enyati, Buffalo and Bernica, each work coal of excellent value, and their great resources in point of tonnage are clearly portrayed in the Special Coal Number. The Enyati and Buffalo Companies are both paying substantial dividends, and it is particularly interesting to note that steps are being taken to secure quotation of the shares of these companies on the Johannesburg Stock Exchange. The following information is abstracted from the several well illustrated pages appearing in our Second Special Coal Number on these properties:—

BUFFALO COLLIERY, LIMITED.

After making the necessary allowance for mining pillars and mining losses, the tonnage of coal in this mine at the 1st January, 1921, was estimated at:—

Gus seam	1,680,000 tons.
Alfred seam	2,700,000 tons.
Total	4,380,000 tons.

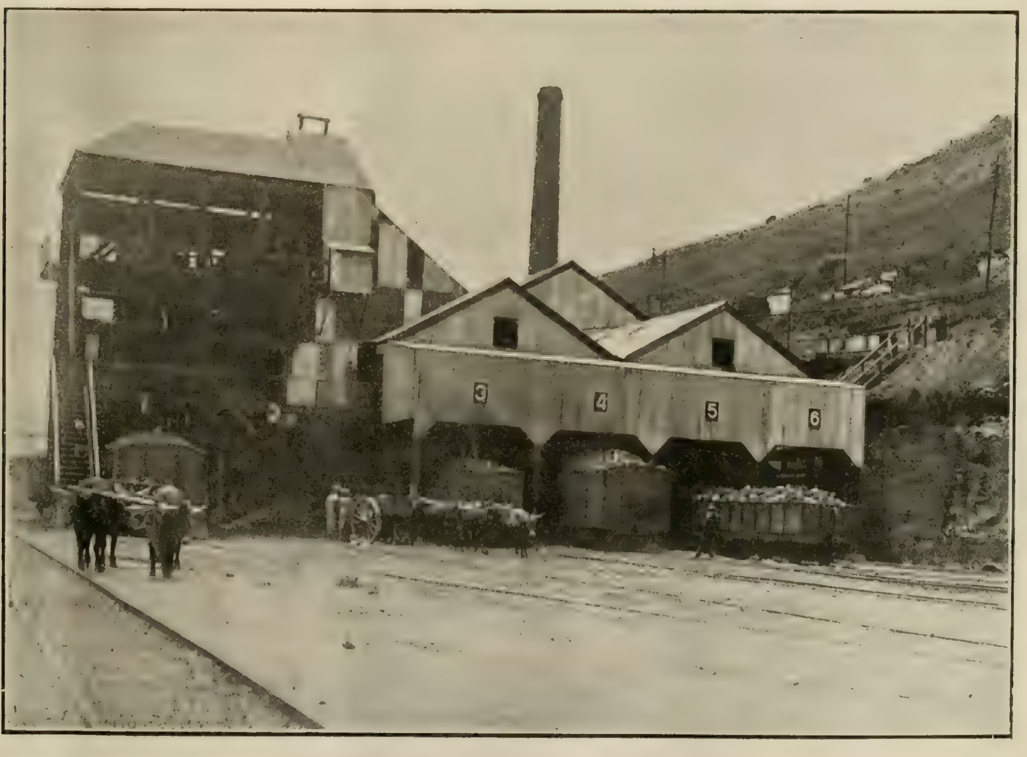
Operations on the property were commenced by the Company in August, 1919, and the colliery entered the producing stage in April, 1920.

The marketable output for 1920 equalled 111,683 tons (equal to 9,307 tons per month).

From January to May, 1921, production was 51,850 tons (equal to 10,370 tons per month).

The capital of the Company is £100,000, divided into 10,000 shares of £10 each. On flotation 4,400 shares were issued to the promoters and vendors as fully paid, in consideration for the property and rights acquired from them; 2,900 shares were issued to the public at par, and 2,700 shares remained in reserve. In order to provide funds to complete the equipment of the mine these reserve shares were issued and readily taken up at 50 per cent. premium during 1919.

The mine is now completely equipped to put out a monthly marketable tonnage of 25,000 tons.



The Enyati Colliery Screening and Loading Plant.

The mine equipment, buildings, plant and mine siding stood in the books, at 31st December, 1920, after provision for depreciation, at £53,981 14s. 6d.

In 1919, after completely writing off all preliminary expenses, there was a profit in the accounts of £4,093. The net profit on working during 1920 amounted to £30,155; provision for depreciation, taxation, directors' remuneration, etc., absorbed £11,616; dividend No. 1, of 20 per cent., absorbed £20,000, leaving a balance of £2,638 to carry forward.

For the period January to April, 1921, the profit, after making provision for the estimated amount of taxation thereon, amounts to £25,117, and the unappropriated balance in profit and loss account at that date to £27,756.

Dividends.

A dividend (No. 1) of 20 per cent. was declared in December last, and a further 20 per cent. dividend has just been declared payable to shareholders registered on the 10th June, 1921.

BERNICA COLLIERY, LIMITED.

The Company was incorporated in Mauritius under the Companies' Ordinance of that Colony on the 7th August, 1917.

The Mine Surveyor's estimate of the coal contents, after making liberal allowances for mining losses, dykes, etc., is as follows:—

	Contents Long tons.	Width of Seam.
Top Seam	473.486	3ft. 9in.
Middle Seam	1,431,392	10ft. 0in.
Bottom Seam	598,539	2ft. 10in.

Royalties are payable on all coal mined and sold from "Alemansnek," at one penny per ton, and on all coal mined and sold from "Goedgeloof" at one and a half pence per ton.

Capital.

The Company was originally formed with a capital of £17,000, divided into 1,700 shares of £10 each. The consideration to the vendors was £4,100, in fully paid shares. The balance of 1,290 shares was issued to the public at par. The original capital proved insufficient for the requirements of the Company, and a loan of £25,000 was raised. This loan was subsequently liquidated through the issue of 3,500 10 per cent. cumulative preference shares.

Accounts.

At 30th April, 1921, the cash and cash assets exceeded the liabilities by £5,954.

Operations.

The Company commenced active operations on the 1st October, 1917. Since then the following is the record of production:—

Period	Marketable Coal output	Coke Manufactured.	Monthly Ave. coal.	Monthly Ave. coke,
	Tons.	Tons.		
1/10/17—30/6/18	23,280	1,417	2,587	157
1/7/18—30/6/19	30,043	5,649	2,508	470
1/7/19—30/6/20	31,295	4,649	2,504	387
1/7/20—30/4/21	33,852	6,893	3,385	689

Up till the end of last year the Company had been working the bottom seam only; the middle seam has, however, now been opened up and is to-day in a position to supply a large tonnage of coal. In May of this year the marketable output totalled 6,007 tons, and the output capacity of the mine is now 10,000 tons per month.

There are 40 coking ovens of the Bee Hive type in commission, capable of turning out, monthly, 1,200 tons of high-grade coke.

ENYATI COLLIERY, LIMITED.

Estimated Coal area:—

Gus seam	3,269 acres.
Alfred seam	3,175 acres.
Total	6,444 acres.

Mine Surveyor's estimate of coal contents, after making liberal allowances to cover mining losses, dykes, etc.:

Gus Seam	23,589,780 tons
Alfred Seam	38,587,480 tons.
Total	62,177,260 tons

Residential Quarters at the Enyati Colliery.

Outputs of Marketable Coal.

The Company started selling coal in the latter part of August, 1918. Outputs since that date have been as follow:

	Total for period. Long tons.	Monthly average. Long tons.
September to December, 1918	40,958	10,240
Year 1919...	195,415	16,285
Year 1920...	321,031	26,753
January to May, 1921	171,417	34,283

Capital.

The original capital of the Company was £150,000, divided into 15,000 shares of £10 each; of this £40,000 was paid, together with £10,000 in cash, as purchase price of the property and rights acquired; the balance of 11,000 shares was issued to the public at par. In order to provide for extensions to the plant, the capital was increased in December, 1920, to £200,000 by the creation of a further 5,000 shares of £10 each. These new shares were all subscribed for at par in January, 1921, by existing shareholders. pro rata to their holdings.

Debenture Issue.

In the middle of 1919 £100,000 first mortgage debentures were issued, bearing interest at 10 per cent. per annum, to provide funds for the further equipment of the colliery on a large scale. These debentures are repayable in 10 equal instalments—the first instalment having been paid on the 31st December, 1920. Both interest and principal are payable in Mauritius at the rate of 15 Rs. to the £ sterling. The present rate is approximately 16.50 Rs. to the £. This obviously gives a considerable advantage to the Company. The debenture issue is secured by a first mortgage bond over all the property and assets of the company.

Accounts.

At the 31st December, 1920, the accounts showed a debit balance in profit and loss account of £8,445. This was after making full provision for all debenture charges to that date, depreciation, taxation, cost of coal supplied to the railways against material, and also after writing off the total amount of preliminary expenses and general expenses prior to production.

For the four months ended 30th April of this year, the working profit has amounted to £53,160. Provision for the current year's debenture charges, taxation, railway material, etc., absorbs £18,188, leaving a net profit of £34,972 on the four months' working; after deduction of the debit balance brought forward from 1920, there remained at the 30th April an available profit of £26,527.

The cash and cash assets at the 30th April amounted to £153,280 11s. 1d., and exceeded. the cash liabilities (exclusive of reserves) by £91,819 15s. 4d. At the same date the total assets of the Company (including property and other capital assets) amounted to £453,907 13s., and the liabilities, including unredeemed debentures, £90,000, balance of debt to S.A. Railways for material £26,298, and reserves £47,888, amounted to £227,380 14s. 4d.

Dividend.

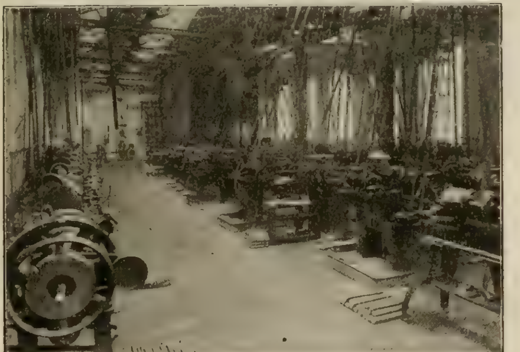
A dividend of 10 per cent. has just been declared, payable to shareholders registered in the books of the Company on the 30th June, 1921.

MINING COMPANIES STRUCK OFF.

Amongst the companies struck off the Transvaal list by the Registrar are the following:—Lancaster Gold Mining Co., Ltd.; Transvaal Oil Shale Syndicate, Ltd.; The Rietspruit Diamond Syndicate, Ltd.; Weigel Exploration Co., Ltd.; C.L.S. Syndicate, Ltd.; The South Midas, Ltd.; The Eclipse Brick Co., Ltd.; Komati Exploration Syndicate, Ltd.; The Mia Mia Syndicate, Ltd.; Good Hope Tin Syndicate, Ltd.; New Banket Reefs, Ltd.; Guy Fawkes Tributing Syndicate, Ltd.; Christiane Asbestos Co., Ltd.; The African Roof Cooling and Preservation Co., Ltd.; Rand Securities, Ltd.; Johannesburg Assets Recovery Association, Ltd.; African Madagascar Agencies, Ltd.; Broad Roberts, Ltd.; Moonstone Diamond Syndicate, Ltd.; Satic (South African) Technical Industries Co., Ltd.; Pyramids Diamond Works, Ltd.; British Reinforced Concrete Sleeper Co., Ltd.; Pretoria Base Metals, Ltd.; African Mica, Ltd.; H. and S. Syndicate, Ltd.; Matzap Diamonds, Ltd.; Norton's Outcrop Syndicate, Ltd.

New German Metallurgic Processes.

The attention of metallurgists is being attracted to a process recently invented in Germany which, it is declared, furnishes a simple, rapid, and effective method of separating alloys into their metal components and extracting metals from mineral ores. This process is said to present many advantages over the hitherto employed method of melting alloys and separating the metal components. According to this process the metals treated with the catalytic agents go into solution in a very short time, the treatment of big blocks of metal being effected in less than 30 minutes. Out of the solution thus obtained the various metals are dissected by the employment of simple methods of chemical reaction, which permit the retaining of the metals one by one. The product first obtained is in the form of a muddy sediment which, after being dried, yields a metal powder ready to be used or melted in crucibles, or to be treated by electrolytic process. Metals and concentrated ores can be treated in the same general way, although they require one or two more operations than pure metal alloys.



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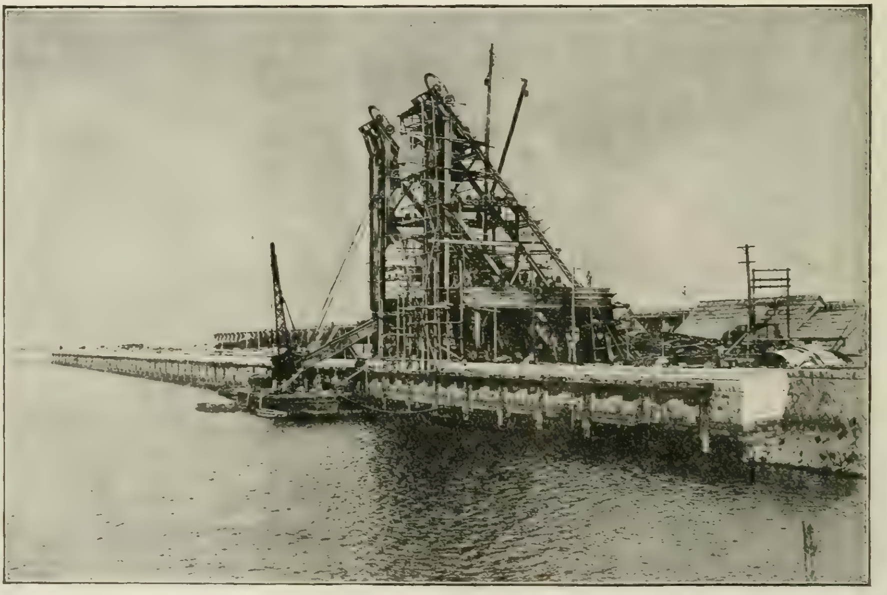

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The Coal Industry.

POSITION AND OUTLOOK IN GREAT BRITAIN—A VALUABLE LETTER FROM OUR LONDON CORRESPONDENT, WHICH SUPPLEMENTS AN ARTICLE APPEARING IN OUR SPECIAL COAL NUMBER—SOME EFFECTS OF THE GREAT STRIKE—LESSONS FOR SOUTH AFRICA—THE PROFIT-SHARING EXPERIMENT—ENGLAND'S SOCIAL QUICKSANDS.

In our second Special Coal Number, which is on sale this week-end, our London correspondent has a deeply-thoughtful article on the great British coal strike, its vast influences on industry, and its lessons for and probable effects on South Africa. Unfortunately, our correspondent's second letter did not arrive in time for inclusion in the Coal Number, and we therefore reproduce it in this ordinary number of the Journal. This illuminating article should, of course, be read in conjunction with, and as a supplement to, the article in the Coal Number.

For want of time, my letter dealing with the relative British and South African coal positions was not as complete as it should have been. I send, therefore, a few additional notes that may be of service. A day or two after the mail left, a provisional settlement of the great coal dispute was reached, and a few comments on this settlement also may be useful to your readers.

Some Basic Truths.

What I attempted to make clear was the basic character of the British coal industry and of the disputes affecting it. This elementary truth does not yet seem to be realised here. Yet the figures are eloquent enough. They amount to clear evidence that unless a sound and permanent settlement is speedily reached Britain's prosperity and power will be crippled for ever. What is not realised is that other nations are equipped to take the place that Britain occupied and that these nations can continue to produce at a far lower level of cost. They will, in fact, improve their output under the pressure of competition, and, wanting cheap coal, England cannot do so. There is a law in industry which is akin to what is known in agriculture as the law of diminishing returns. New land will produce good crops given a reasonable amount of labour. But the crops do not increase in proportion to the labour bestowed on them; the land in a wheat field may produce 100-fold, but it will not produce 500-fold. So in industrial countries the law of diminishing returns comes in. Competitors arise, mines get deeper, or are exhausted, workers organise, first for food, and then for "comforts," wages—and so on.

These factors of retardation are at work in England, and the concluding paragraphs in my last letter were intended to lead up to a brief notice of the need for greater education and skill in the British Isles, if they would maintain their industrial supremacy. Quality must take the place of quantity. But the factors on which quality depends do not exist, and cannot be created in a year or two—with the result that the heads and leaders of British industry are turning back, like the bankers, to the old wallows. Cheap labour that will compete with the cheap labour of all countries is their remedy. But in an old industrial country there are limits to the cheapening process. England has reached them.

Some Arresting Figures.

Here are some figures that throw light on this problem of national competition viewed from the quantity platform. Last month Britain produced 19,000 tons of steel and pig iron; the figure will be smaller for June. In May, 1920, the two classes of metal totalled 1,585,000 tons. The failure of the coal supply accounts for the difference in the two totals.

In the same month of May, 1921, the steel and pig iron output of the States was 2,720,000 tons, or nearly double the English figure of last year, when the boom was at its height. And this total of nearly three million tons in the States is, so far as the steel figures are concerned, only about 50 per cent. of the steel tonnage for 1920. The pig iron production of the United States was 37 million tons last year.

I have avoided burdening these notes with statistics, as it would be a mistake to make comparisons based on the abnormal figures of to-day. But the point to be borne in mind is that the raw materials available determine the relative places of two competing countries; and in this important field the older countries of Europe will be more and more at a disadvantage. Coal and iron are in Britain subject already to the law of lower returns, just as the Rand is to-day.

Only education and increased skill can save the situation. The workers' output must rise in value relatively to that of other workers outside of England. But so far there is little evidence that this urgent need is realised. The decision appears to be "Let us go back to the quantity basis." It is a cut-throat principle.

In other fields the outside worker on lower values is equally threatening. A daily paper says to-day that manufacturers are "elated, and prints under this introduction the following item:—

"Sheffield.—The demand for textile machinery has recently shown tremendous growth. Shipments of greater magnitude than pre-war were going to Japan, China, India, Australia, and the United States, until the fuel shortage crippled output. Heavy arrears have to be overtaken." This extract is not complete. It should have concluded, "Japanese operatives work 12 hours a day for 1s. 6¾d. Japanese mills run 144 hours a week."

Mr. C. F. Tainton,
Author of this instructive article, which supplements his valuable letter in the Special Coal Number.

Real Industrial Functions of Coal.

The facts point, of course, to the need of lifting British industry to higher levels. For example—and this is the point I was coming to—coal must be used not as a mere fuel, but as a valuable mineral that demands the labour of skilled chemists and trained overseers to secure the best results.

Your paper has done something to call the attention of South Africa to the hidden values in coal, and presumably the new capital which is seeking investment in your coalfields will not overlook these values. But England is burdened with old machinery and old plants. To change them will take much capital and much time. Meanwhile the competitors, equipped from the start with the latest ideas, will be gaining ground. Most of the countries to which Sheffield is shipping textile machinery have cheap fuel. In the States, for example, the coal cost is about 12s. per ton near the mines, where the cotton mills are. In England coal has cost about 40s. Will the new settlement just announced make coal much cheaper here?

The answer is—Not yet. The miners have yet to ballot upon the terms offered by the owners; but it may be assumed that this is a formality, and many of the pits are already reopening. Assuming, however, that the strike is over, will the new terms make a great difference in the price of coal? They cannot, unfortunately. The cut in wages is only 2s. a shift in July, with 6d. added for August and September. In October the wages change to the 1914 basis with 20 per cent. added. Now the 1914 scale was a high one; and seeing that 1¾ tons of coal are required for every ton of steel it is patent that the cost of steel in America must continue far below the cost of British steel. Possibly the new scale will affect the mining costs enough to reduce the coal bill for a ton of British steel to 50s; but the American coal-cost for a ton of American steel will remain about 20s. How, then, can British manufacturers compete in normal markets?

The Great Profit-Sharing Experiment.

It is said, however, that the settlement introduces a new and great principle, that of profit-sharing, and that this will suffice to increase the output and will, if fairly tried, bring in a new industrial era of co-operation and goodwill. To anyone, however, accustomed to these industrial disputes and the economic factors beneath them the settlement, bepraised as it is, is really a sham. It is impossible to say, without an inspection of conditions in each coalfield and, in particular, an estimate of the human element, whether it will work well or ill. I imagine, however, that disputes will soon arise again; or at least complaints that the agreement is being broken in the spirit, if not the letter. It provides that the wages paid shall be, as stated, 20 per cent. above the 1914 standard. To this figure other costs for stores, management, etc., must be added. The owners then take 17 per cent. of the amount paid in wages to the miners. If there is any profit above this total of working costs and profit, it will be divided in the ratio of 83 per cent. to the men and 17 per cent. to the owners.

The danger of new disputes lies in this profit-sharing clause. The owners' share is subject to taxation, and this will take a third or more of the owners' profits. Now, these profits are not equal to a 17 per cent. dividend being calculated on a portion of the cost only. In reality they come down to about 11 or 12 per cent. of the amount expended in getting the coal. Of this 12 per cent. a great part is taken in taxes by the State and other authorities, leaving the owners about six or eight per cent. or less.

Output per Man a Vital Factor.

I go into these details because in my view it will not pay the owners to encourage the men to a big output per man. It is the output per man that is the basic figure in these mining ventures. The British experts seem to ignore this vital factor, in all their calculations. It is rarely mentioned because probably it is too technical to be "interesting" to the readers of the penny papers. The South Wales output per man per shift was down last year to little more than half a ton —the figure was, I think, .55— that is to say, the miner produced a little more than a ton of coal in two shifts. On other fields it was better. Whether the South Wales figures meant shirking, or are due to narrower beds, harder coal, and suchlike variants, I cannot say; but it meant an annual production of, say, 160 tons per man. The corresponding figure in America before the War was 626 tons per man, in Australia 489 tons, and in Canada 440 tons. There are serious elements behind these comparative figures; but let me go on.

Obviously the miners will try and increase their profits by increasing their output per man. This they can easily do. But a larger profit, based on a heavy output, is against the owner's interests. He gets too little of the profit from the larger quantities won, and is, in fact, asked to exhaust his mine for the benefit of the miners. This he will not do, and the surplus money, if any, will be spent by him in betterment, that is, in putting in better machinery, improving roads and sorting plant, and making everything ready for a larger output on the basis which gave a larger profit on a larger production.

Without going into details such as are necessary to make this point quite clear—an actual case must be figured out—the settlement is in my view full of defects, that human nature will soon reveal. It is possible, of course, that the owners, realising that the times are not favourable for another quarrel, will say nothing if the output per man suddenly rises and with it the men's profits. But these strike settlement terms cannot, in my opinion, form the economic basis of Britain's coal future.

Britain's "Social Quicksands."

This is the main question which will interest South African owners who are seeking to know the permanent factors in the economic position of their competitors. The strike settlement here is agreed for 18 months. In this time its defects will be exposed and a new discussion will be necessary. There are, as I showed last week, deep social quicksands beneath England's industrial life, and the firm ground is still remote. It is not necessary to speculate about its direction or position.

The immediate result of the settlement will be that some coal may soon be ready for shipment. There are ships enough, and freights will be low. To Bombay, for example, the quotation at the moment of writing is 22/6 per ton. If we put the tidewater price at 30s., this freightage means that English coal will not be sold for less than 55s. per ton at Aden, and say 60s. at Bombay. This coal will be good, but not of the best quality, and with shipping markets in favour of cheap carriage South Africa should be able to hold her own, in the immediate future at least. The Indian Ocean ports cannot be reached easily from North America, and the competition that will eventually be formidable in that field is China, and perhaps Australia. England will export a good deal of coal if the business depression continues, since her manufactories will not call for the full output of the mines. But this coal competition is not likely to crystallise into permanence just yet. Many things must happen here before the British populations settle down to the long quietudes of a 20th century peace.

C. F. TAINTON.

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SOUTH AFRICAN MINING AND

ENGINEERING JOURNAL.

Higher Rand Mining Efficiency and Lower Working Costs.

By J. J. Kinleyside.

The following essay was amongst the best of those submitted for our recent competition. It is written by a former prize-winner in a "S.A.M.J." Essay Competition.

"Take care of the pence, and the pounds will take care of themselves." This saying is applicable not only to personal expenditure, but also to the working of any large business concern, and in my essay on the reduction of working costs on Witwatersrand mines I shall make it a prominent feature.

Travelling Inspectors.

Many instances could be given with regard to the waste of stores, use of obsolete tools, lack of system, and to remedy these I suggest that mining groups appoint a special official, whose duties would be to watch over and check these matters. He should have full power to examine the monthly stores issues, to note the number of natives employed on different jobs, the condition of the tools used on the mine, and to suggest improvements when desirable. He should secure the confidence of the workmen as well as that of the management, and should make himself familiar with the working of each mine in all its branches. He should also furnish a complete monthly report, with suggestions for improved efficiency, to headquarters.

Bonuses to Employees.

Suppose the working costs of a mine are 20s. per ton, and in order to allow the mine to pay its way it is imperative that the working costs be reduced to 17s. 6d. per ton. One way to attain this end is by co-operation of the management and the workmen. Let the manager say to his men words to this effect: "You help me to bring down working costs by being careful with stores, by using your practical knowledge of making shift with what stores and materials you have, and I, on behalf of the company, will help you all I can towards starting a co-operative store on the mine in order to reduce the cost of living." Or let there be a system of bonuses based on the reduction of working costs. For every shilling in the ton brought down give the employees a percentage of the amount saved. This would put the men on their mettle and create an emulative spirit between workmen on different mines.

Stores for Workmen Underground.

On many mines there is great lack of method in dealing with the issue of stores to underground workers. The morning shift is supposed to go down at seven o'clock, but the stores required are usually not to hand, and delays occur and everything is in confusion.

I suggest that men on day shift write out a statement of what stores may be required for the following day's work, and hand the order to the shift boss. The stores would then be despatched to the level required on night shift, and be placed in a locked cupboard ready for the miner or mechanic on the following morning. On every working level commodious and strong stores cupboards should be fixed, one for each miner and mechanic. On every level and adjoining every pump chamber there should be a strong bench fitted with pipe and other vyces. In each cupboard there should be a number of spanners, cold chisels and miscellaneous tools. The work benches should be well lighted. In fact, every possible means should be utilised to assist in having all minor repairs executed on the spot.

Lighting Underground.

Motor generators mounted on wheels and run to the working face would solve the question of underground illumination. These could be connected by trailing or fixed cables to the nearest power supply mains. A couple of 100 c.p. lamps would give ample light in any stope or drive. When ready to blast, the portable lamps could be disconnected and the trolley run back from the working face. Underground sorting could then be carried on, the waste packed in disused stopes, and the hauling engines employed only for pulling reef. Any intelligent electrician, given a free hand, could fix up an experimental motor generator from a small three-phase motor and a direct-current dynamo or motor.

Mine Telephones.

Some few years ago I submitted to your journal an essay on mine telephones, which you inserted and for which you granted me first prize. My system was simple and inexpensive, and with it dozens of portable 'phones could be employed, saving their cost in loss of men's time in a few months. Unfortunately, telephones at that time did not catch on. If a miner wanted jumpers, or if there was an accident, or the electrician or pumpman required some special materials, he simply switched his 'phone on to the main telephone line, called up the banksman and gave his message.

A Typical Scene on the Rand.

Establishment of a Receiving and Repairing Depôt for Surplus Machinery from Branch Mines.

If all mines had a thorough good clearing up of their surplus stores, disused and broken small machinery, such as rock drills, electric motors and switch gear, blocks and tackle, picks, shovels, etc., and these were forwarded to a central repairing yard either for re-distribution or for sale after being repaired by skilled mechanics, much valuable material could be put again to good use instead of deteriorating through neglect and exposure to the elements. A main repairing workshop could be erected, fitted with the best and most modern electrically-driven tools, and a staff of expert workmen engaged who would be ready to go out to any special breakdown job or any distant mine. A feature of such a central repairing shop would be a system of having repair work done on contract. For instance, suppose 1,000 derelict wheel barrows have been collected in the yard: a contract given for putting these in working order at £1 a piece would find work for a gang of mechanics, and save them tramping from one end of the reef to the other in search of work. It would also benefit the mining group, as they would then have 1,000 wheelbarrows as serviceable as new ones, and save on the cost of new barrows at least £1,000. This is only one individual case. The Witwatersrand mines are simply flooded with scrap machinery in all stages of decay. A contract system for repair work would find employment for a large number of men. They could work as many hours as they pleased on the job. Every man would be his own master, and his earnings would depend on his ability and energy. A fair price for a fair day's work should be the motto, and only British subjects employed. There's too much of this employment of foreigners on the mines, and it should be checked.

Clever Ideas seen on Mines.

In the course of one's travels from one mine to another a man with an observant eye must notice in many unexpected places clever ideas for achieving big results at small cost. Sketches and descriptions of these might advantageously be collected and brought before the notice of the public in book form, or could be forwarded to an advisory board with a view to their more extended use on other properties.

The Personal Element on a Mine.

If managers, engineers, and other heads of departments could only realise what a difference a cheering word and a pleasant countenance makes to a man in bucking him up in his daily work, instead of approaching him with a surly, scowling face, mine officials having the interests of owners at heart would flock to the nearest school of good manners. You can get 20 per cent. more work out of a man if you behave as a gentleman, and treat the workman as one, than you will do if you come the domineering stunt with him.

Welfare committees should be promoted by mine managers, at which matters of sport, improved methods of working, and minor grievances among the men could be discussed. Lectures should periodically be given by experts on mining matters. Once create a spirit of brotherhood between the workmen and management of a mine, get the men to feel proud of and loyal to their employers, and then, and not till then, will working costs come down.

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Six Months' Mineral Returns.

THE HALF-YEAR'S GOLD—COAL, DIAMONDS AND BASE METALS—INCREASED GOLD AND COAL PRODUCTION.

The publication of the June mineral returns by the Mines Department makes the total returns for the first six months of 1921 available. The gold output for the period was valued at £16,675,602, or if the estimated increased value of gold be taken the total value was £20,532,430. It is noteworthy here that the Transvaal Chamber of Mines estimates the value of the June gold output at £5.375 per fine ounce, which represents an increase of £760,682 in the total value of that month's output. The diamond output for the half-year amounted to 519,892 carats, valued at £2,069,275, against a total return for 1920 of £2,545,000 carats, valued at £14,762,899. Siver returns for the half-year amounted to 384,038 fine ounces, valued at £58,779. Coal sales for the coal mining industry of the whole Union amounted to 5,673,574 tons, valued at £2,591,341. For 1920 the total coal output was 11,473,452 tons, valued at £4,506,572. Sales and shipments of copper ore and concentrates amounted to 61 tons, valued at £2,825. Tin concentrates and metallic tin were 888 tons, valued at £89,220. Last year they were 2,451 tons, valued at £446,284. The output of other base metals amounted in value to £78,478. The grand total, including the gold "premium," was £25,422,348 for the Union. It may be recalled that the total mineral output of the Union for last year was valued at £55,194,204, the falling off shown in the first half of this year being due, of course, to the big drop in the diamond returns.

The Outlook for Base Metals.

The latest mail reports regarding the position in the base metal market are a little more favourable. Writing in mail week, a correspondent says: "A quiet and on the whole uneventful session was experienced at the resumption of business on the Metal Exchange. There were no signs, so far, of a revival of consumptive demand, and while little metal was on offer, the paucity of buying orders imparted a depressing atmosphere to most markets, and quotations were inclined to sag. The Tin market, however, provided a bright exception to the prevailing dullness. Business broadened still further, and with buyers keen prices shot up 45s. per ton, though the official quotation at the close displayed a rise of only 35s. for both cash and three months. A good impression was created by the publication of the statistical position of the commodity as at the end of the past month, the figures revealing a decline in stocks of 127 tons and a fall in total visible supplies of 814 tons. At one time it was feared the statistics would announce a fresh accumulation of metal. In some quarters yesterday there was also a feeling that the not distant future may witness a modest revival in the tinplate industry. Demand for standard copper fell away again on 'Change, and the market, after giving some show of strength at the opening, eased off later and final quotations were without net alteration. Electrolytic was steady. A moderate inquiry for lead found holders releasing metal with some freedom and prices gave way, to close 5s. lower for prompt and 2s. 6d. easier for forward shipments. Spelter (zinc) was weak. Only a small turnover was recorded, but quotations fell 12s. 6d. for near and 7s. 6d. down for forward deliveries."

The Tragedy of the Heidelberg Areas.

THE GOVERNMENT AND THE MUCH-DISCUSSED CABLES—AN IMPARTIAL EXAMINATION.

By G. A. Robertson.

The recent controversy in Parliament over certain cables sent by the Minister of Mines to the High Commissioner in London, which stopped certain capital to develop those areas, leaves the public under the impression that the Mines Department of the Union of South Africa were seized with an extraordinary fit of energy in order "that their officers should be correctly stated." The Minister's statement that Mr. W. E. Bleloch had the capital for the Nigel Van Ryn Mine is hardly correct, considering the limited amount received, which was £12,500. Now, one of the Rand mining houses formerly held those claims, which were then known as the Marievale Nigel Gold Mine, and spent about £40,000 on prospecting, several shafts having been sunk to a depth of about 250 feet on the incline. These claims were allowed to lapse owing to the company failing to locate payable reefs. Mr. M. T. Cook took over the management of the property in July, 1918, and after dewatering an old shaft found a station cut on the first level and a drive going north on dyke contact.

At the consulting engineer's suggestion a crosscut was started, running east through the dyke at the far end of the old drive, and within 18 feet the Nigel Reef was picked up, and, although narrow, showed good values. Further development disclosed payable ore.

Good Work on a Small Capital.

The mine, therefore, for £12,500 developed about 15,000 tons of payable ore, put up a compressor, boiler and lighting plant, and erected two small crushing mills loaned to the company. True, little gold was got, due to the fact that the company was crushing on too small a scale, and secondly, that they had no cyanide works. Mr. Bleloch did his best to try and get the public interested in those areas, and the scale of crushing operations was obviously good enough for Mr. Bleloch to write to the columns of this journal about December, 1919, to inform the public that the Nigel Van Ryn was already producing. After these mills were worn out a second-hand 10-stamp mill was erected as a temporary plant. Unfortunately for the company, the gold from the mine does not readily amalgamate with mercury, though tests made prior to my going to the mine in October, 1919, I understand, showed a 52 per cent. recovery by amalgamation. That figure compared favourably with the yield from the neighbouring mines, such as Sub Nigel and the Nigel Mine, and it was reasonable to anticipate a gold recovery of about that figure if the amalgam tests were correct. These tests were certainly wrong, and it is unfortunate that more elaborate tests were not made by some recognised authorities, because the gold recovery per ton crushed was far short of that required to pay expenses of the mine and carry on development, which was Mr. Bleloch's policy, pending further financial support for the company.

Expert Visitors.

When the company's funds became exhausted the directors in London wanted an independent report on the mine. Mr. J. M. Calderwood, the well-known consulting engineer, inspected the property, and I was informed that his report was favourable. Dr. Rogers, the Government geologist, visited the mine, and I can well remember the day of his visit, because he came and had a look at the mill just after he came out of the mine. The mine manager's face was all smiles, and on my enquiring if he had got half a million of money cabled for the mine, he told me he had the Director of the Geological Survey underground, and that he (Dr. Rogers) expressed surprise at the reef he saw, and wondered how the mine had been abandoned twenty years ago.

Plans Upset.

Mr. Bleloch had gone to London with the view of raising further capital for the Southern Van Ryn and the Nigel Van Ryn mines, and when he was on the water, on his return journey to South Africa, the Minister of Mines sent those famous cables which upset Mr. Bleloch's plans. The result was that I got one month's notice from the mine. All the daily-paid men were paid off, and there remained on the mine, including the manager, four men all told. The most of the manager's time was spent during that month on a reef-discovering expedition on the Southern Van Ryn claims. I was instructed to run the stamps, tram and crush development rock from the dump, so between the three of us we kept the compressor going to pump the water out of the mine, and ran the stamp mill a portion of the day and afternoon shifts as steam and water permitted. Both of these commodities were short of the requirements.

Milling Under Difficulties.

By the end of the month (June) I had accumulated 82 ounces of gold from 190 tons crushed. The gold just paid our wages. There was no assay office on the mine, but previous results from the Wheeler pan, which was the only amalgamating machine of any use on that rock, showed by assay recoveries from 20 to 30 per cent. of the gold contents of the ore. This meant that the development rock would have a value of about 7 dwts. per ton. The Nigel Van Ryn became indebted to the Southern Van Ryn through the financiers holding back over those cables. An amalgamation scheme between the two companies presented possibilities of surviving the ordeal of the Minister of Mines' action. An additional 230 claims then became the property of Southern Van Ryn, who had £40,000 cash in hand. The idea then was to extend the crushing plant, put up a cyanide works at the Nigel Van Ryn section, and take the gold out of the mine. Mr. Bleloch went too far in erecting a second reduction plant on the northern section of the mine, about three miles from No. 1 mill, and expecting profits from the Nigel Van Ryn mill practically from the commencement of milling. A tube mill 16 feet long by 4 feet diameter was purchased and erected below the existing stamp mill. The cyanide tanks were constructed of galvanised iron, and all the pumps, valves, pipes, extractor boxes, etc., were of second-hand material. Progress was also being made with No. 2 reduction plant, and three large boilers were purchased from the E.R.P.M. and partly erected in close proximity to the coal shaft on the property—certainly an ideal spot for the generating of cheap power, as the cost of mining the company's own coal seam at that time was about 4s. per ton. Unfortunately, there never was the cash to see No. 2 mill through, and the closing down of the northern section of the property was delayed too long. From the date of the amalgamation of the two properties all energy and money should have been concentrated on No. 1 reduction plant and developing the mine in that vicinity.

The stamps and tube mill were due to run in September, 1920, but it was not until November that crushing started. A Sturtvent roll-jaw crusher took the place of the stamps, which were not used since the amalgamation of the two properties. This crusher received the ore from the mine and reduced it to about a half-inch mesh, which was quite a good product for tube-milling purposes. It could not, however, be compared in fineness with the discharge from a stamp mill on a similar-sized mesh, and the internal fittings of the tube mill which came with the mill proved incapable of dealing with the abnormal quantities of small discharge pebbles produced in the tube mill. The result was that the daily tonnage crushed fell short of the forecast.

Things were therefore not humming as well as Mr. Bleloch wished, and one morning he arrived on the mine and I got my walking ticket on the spot. Others came and went in quick change, and after the mill had been shut down for a fortnight to make certain alterations Mr. Bleloch thought he was out of the wood. On the 20th December, 1920, at the annual meeting of Southern Van Ryn, Mr. Bleloch announced, "amid applause," that the company's reduction plant "is in full commission from to-day," and predicted an output value of £4,500 for January, and that the company would be able to retain its cash balance of £4,000 in hand.

Considering that the reduction plant was built mostly of second-hand material and had a few trial runs in November and December, 1920, it was unreasonable to expect a gold declaration for January sufficient to pay the expenses of the mine, even assuming the mill had been crushing the foretold 100 tons per day. The upshot was that the gold declaration for January was a washout. For February 92 ounces of gold were declared from 1,000 tons crushed. Both the March and April operations showed a reduction both in tonnage of ore crushed and gold recovered, and the latest news, according to Mr. Bleloch, is that the mine is closed down for want of capital. Mr. Bleloch's £50 note issue does not appear to have been a success, notwithstanding the *Sunday Times* tip that these notes were an "attractive investment." The reduction plant of the Southern Van Ryn had to be an exception to the rule in order to fulfil Mr. Bleloch's expectations. Local history has shown, however, that ample funds and some rich ore have tided many a reduction plant to the profitable stage and covered a multitude of sins during the conditioning period. The Southern Van Ryn had all these except the funds.

A leaky frying-pan, insufficient oil, and too many fish to fry were the undoing of the Southern Van Ryn, otherwise they would have beat the Government; and why the Government should have shown opposition is what nobody can understand. With such authorities as Mr. W. T. Hallimond and Mr. H. S. Denny writing of the continuance of the Van Ryn Reef series through the Heidelberg areas, backed by a favourable report from Mr. J. M. Calderwood, there is sufficient justification for an inquiry into the whole circumstances. The Minister of Mines' reply to the questions asked in Parliament over those cables contains so many misunderstandings that they make his reply unsatisfactory. Mr. Bleloch has had a hard fight. I can say that, although I felt aggrieved at what I considered hardly fair treatment of myself, he has my heartiest wishes for eventual success, and I feel sure that that is the feeling of the public and most of those who worked on the Southern Van Ryn.

THE SOUTH AFRICAN RED CROSS SOCIETY.

District Mine Ambulance Competitions: Krugersdorp.

By the courtesy of the directors and Mr. C. Glyn, the manager, the third annual District Mine Ambulance Competitions for the mines in the Krugersdorp district, will be held at the Durban Roodepoort Deep, Ltd., Roodepoort, on Sunday next, the 7th instant.

Under the new regulations, the competitions for both the surface and underground teams, *will be held on the surface*. As there will be ample space available for visitors to see the competitions, it is hoped there will be a large attendance of those interested in the first-aid movement.

The following teams have been entered, the captain's names being given against each:—

Underground Competition Teams.

(a) Consolidated Main Reef Mines, Ltd. (J. S. Southward).
(b) Consolidated Main Reef Mines, Ltd. (E. R. Hippert).
(c) Luipaardsvlei Estate and G.M. Co. (H. Jackson).
Lamps will not be required.

Surface Competition Teams.

(d) Consolidated Main Reef Mines, Ltd. (N. N. Newland).
(e) Luipaardsvlei Estate and G.M. Co. (T. J. Emerton).

No entries have been received from the Aurora West United G.M. Co., Durban Roodepoort Deep, New Unified G.M. Co., Ltd., Randfontein Central G.M. Co., Roodepoort United G.M. Co., and West Rand Consolidated Mines.

Notice to Competitors.—The competitions will commence at *9.30 a.m. sharp*, and every team must be on the property ready to start at *9.15 a.m.* Captains of teams will report to the secretary at 9.15 a.m. to draw for order of competition. Competitors will not be permitted to see the work of other teams, but will be required to return immediately to the general office after they have completed their practical test. Each member of each team will be given a copy of the rules of the competition, with which they are expected to be conversant, several alterations having been made since last year.

Lunch will be provided, by the kindness of the management, but owing to the limited accommodation available only officials and competitors can be served. Tickets for the lunch will be issued to the latter by the secretary on calling the roll.

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Mine Accidents and Miners' Phthisis.

LECTURES ON THE MINES.

The Prevention of Accidents Committee of the Rand Mutual Assurance Company, Ltd., continues its propaganda work unabated. "Safety First" lectures on the mines form one of its recent activities.

A lecture was given on Wednesday, the 27th inst., by Mr. A. M. Anderson, Ambulance Organiser to the Prevention of Accidents Committee, at the Recreation Hall, City Deep. Mr. W. G. Adamson, underground manager, presided, and in spite of the cold weather there was a large and appreciative audience.

The lecturer briefly outlined the various causes of accidents, and illustrated each by referring to striking cases of negligence which had come to his notice. He drew particular attention to the alarming increase which had taken place during the first six months of this year in accidents due to falls of ground, and enlisted the co-operation of the employees of the City Deep to assist in reducing this type of accident. The Committee was doing a great deal of propaganda work by means of safety competitions, a monthly periodical (*The Reef*), safety bulletins and other service features, but it was realised that it was only with the co-operation of the men themselves that accidents can be reduced, and it was to them the speaker made an earnest appeal.

Mr. Adamson reminded those present that the City Deep was the winner of one of the safety competitions for the year 1919, showing the best improvement in its accident death-rate in this class. Although they were unsuccessful in this competition for the past year they were all out to win the ambulance shield in the forthcoming mine ambulance competitions.

The lecture was preceded by a "Safety First" film depicting some of the ways in which accidents occur underground, and was followed by the film entitled "Dust that Kills," illustrating the various possible causes of miners' phthisis, and the measures employed to counteract them and to ameliorate the condition of sufferers from this disease.

Welgedacht Outlook.

Despite a very satisfactory financial position, the Welgedacht contemplates continuing its career of masterly inactivity. Speaking at the annual meeting of the company in London the other day, the chairman, Mr. L. R. Davies, said:—"I regret to say that the outlook at present is not a promising one for mining ventures, consequently any question as to providing new capital for the purpose of prospecting and developing the gold section is, for the time being, impracticable. It will interest you to know that the present financial position is very satisfactory. Our liquid assets consist of War Loans, which you will observe are all short-dated, amounting to £24,150; loans against Stock Exchange securities, £2.371; and cash in London, £9.6; a total of £27,489, to which must be added the balance owing for machinery, £38,200, making a total of £65,689. The current liabilities are fully covered by the amounts owing to sundry debtors. In addition to our 1,240 gold mining claims, we are possessed of the surface rights of the farm, which are of considerable value, and our coal seams will yet prove to be an asset of value when gold mining operations are begun. As our issued capital is only £156,750, it is fully represented by our assets. Before closing my remarks I should like to express the appreciation felt by the board of the services of the companys' agents in South Africa, particularly in carrying out the sale of the machinery and plant."

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EDITORIAL.

THE MINERS' PHTHISIS COMMISSION REPORT.

What is described as an interim report of the Miners' Phthisis Commission, though in reality it is the final report of that body, has been issued, and we print some extracts from it elsewhere in this issue. The terms of reference, it will be remembered, were very comprehensive, embracing, *inter alia*, the evidence given before the Select Committee last year, the question of miners' phthisis prevention, an insurance system, compensation for industrial diseases generally, and the drafting of the necessary legislation. The Commission seems to have got through an amazing amount of work; it held 59 sittings in Johannesburg and 43 in Capetown, and examined 68 witnesses, besides visiting mines and workshops. Indeed, it seems to have found the task set it a trifle too ambitious to be successfully accomplished in its entirety. Thus, the question regarding a system of insurance was found to assume such proportions that the Commission wrote to the Minister on the subject and received from him the welcome ruling that its view was only required in as far as miners' phthisis was concerned. In noting that limitation the report states:—"We wish, however, to emphasize that in our considered opinion the disease of 'pure' tuberculosis (in so far as the workmen may be called upon to contribute) should not be considered by itself alone, but a comprehensive scheme formulated for all forms of sickness and invalidity." With reference to the question of prevention, the Commission offers certain recommendations. "The subject is, however, a vast one, and though we have given it our very careful attention, we feel that we are very far from being in a position to give a complete report thereon at this stage." There remains "the question of the necessity for compensation for industrial diseases generally." The Commission has taken some evidence on this matter, but the field is a wide one, and "we are not in a position at this stage of our inquiry to report thereon." In an important explanatory memorandum on the amendments proposed in regard to the Miners' Phthisis Act, 1919, the Commission points out that it has not attempted to deal with all the amendments proposed in the Draft Bill appended to the Report, as many are mere amendments of language made to ensure greater clearness or are re-arrangements of the present Act in what appears to be better order, or are the repeal of provisions which once formed a necessary part of the then system of Phthisis compensation, but have now become obsolete. Speaking generally, the system of the present Act and the scales of compensation provided in it have been adhered to, and the alteration is merely as to the methods to be employed and as to auxiliary provisions which follow logically from the provisions made in the 1919 Act. The Commission states that "much may no doubt be said in criticism of the scales of compensation and the system of life allowances to dependents provided in the Act of 1919, but much may also be said in their favour; unless a reduced system is applied to the Awards already made under the Act of 1919 the question is of comparatively small practical importance; and no case has been made out sufficient to justify the cancellation or reduction of past awards rightly made under the Act of 1919." It is proposed to extend the Act to all employees on a mine who work underground regularly, in the sense of underground work as defined in the Act of 1919, without regard to the amount of their time which they spend on underground work. It is also proposed to provide for the expenditure under the Act being levied on the silicosis rate alone after the 31st day of July, 1924, and for the appointment of a statistician in order, *inter alia*, to ascertain the true silicosis rate of each mine in the meantime. The report in its introductory paragraphs deals with the general legal principles governing accidents and industrial disease, the composition of the Miners' Phthisis Board—then *sub judice*—the question of a Statistician, the inadequate pay of the members of the Medical Bureau, and the question of an appeal from the decisions of that body. It makes important recommendations—quoted elsewhere—on rock drills and ventilation, and it reprints with approval the opinions of experts on the need for more research work, due to the ever-increasing depth of mine workings. The amended Bill drafted by the Commission, it will be remembered, was too late for consideration by the recent session of Parliament, and possibly by the time it is brought forward the Departmental Committee which is now carrying on the work of the Commission will have some further improvements to suggest. Apart from summarising the voluminous evidence led before it, the work of the Commission has not proved very fruitful.

OUR SECOND COAL NUMBER.

The Second Special Coal Number of the *S.A. Mining and Engineering Journal* is now on sale. In view of the large amount of additional material which has had to be included in the Number and on account of the excessive cost of production, it has been decided to increase the price to five shillings. The Number constitutes a bulky volume of over 200 pages and within its covers will be found articles on every conceivable aspect of the South African coal trade. Every colliery of importance in the Union and Rhodesia is dealt with, and there are valuable contributions by expert technical writers and colliery managers on the History, Geology, and Technology of South African coal. The Number contains many new and excellent photographs and valuable maps and diagrams of the coal fields, whilst an attractively drawn cover adds greatly to the appearance of the issue. It is safe to say that at five shillings this is the cheapest technical work published in this or any other country.

In this second Special Coal Number the Journal endeavours to review the history, present status and future outlook of the Coal Industry of the Sub-Continent, and especially attempts briefly to chronicle the various events which have happened in South Africa's dominion of King Coal since the publication of the first Coal Number a year and a half ago.

In the present issue the broader aspects of this coal branch of the Mineral Industry in South Africa are, after a brief account of its history, first dealt with. Coal is a commodity extremely susceptible to trade fluctuations. It is the basis and key industry of all other industries.

The journal has accordingly devoted some space to the coal statistics of other parts of the world, to costs of production and sales prices in Europe and America, to the calamitous strike of miners in the British Isles, which has had its lessons for and effects on South Africa, and to the resources of countries which were more greatly favoured by the carboniferous epoch than was South Africa, but which possess great disadvantages in the cost of production when compared with the Union.

The latest estimates as to the coal reserves of the four Provinces of South Africa and their roughly classified values are given, and in this issue, too, the coal resources of Rhodesia are appraised as accurately as existing and admittedly inaccurate estimates will allow.

The Number deals also with the question of utilising low-grade coal, which has been, and still is being, scandalously wasted in South Africa. It is shown what is being done in other countries to conserve this national asset, and it is made clear that it is high time the Government and Coal-owners should combine to do something tangible which will at least arrest the growth of those dumps which bestrew the high veld and which are a lasting disgrace to the business brains of the country. The journal deals with the subject cf by-product plants and equipments. Photographs of coal mines, of Railways and Harbours equipment designed for the coal trade, and of prominent coal and colliery officials, diagrams and maps of the coal fields, a useful summary of collieries, showing their situations in regard to railway stations, and various other features, will render, in the public estimate, the Second Coal Number a worthy successor of the first and pioneer number, which portrayed the essential features of the Coal Industry of South Africa.

The whole issue has been compiled and edited by Mr. Owen Letcher, editor of the *S.A. Mining and Engineering Journal*, who has travelled many hundreds of miles over the coal fields and to our coaling ports with a view to obtaining the most authentic and up-to-date data for the production.

WHY NOT CORNISH MINERS?

It seems to be generally agreed by those competent to judge that white labour inefficiency is at the root of the high working costs on the mines of the Rand to-day. Though in a measure due to the prevailing slackness or "ca-canny" policy, it is considered by many in intimate touch with the industry that a very real incapacity due to inexperience and lack of instruction is the cause of the poor results now obtained. Most of the best of the "old-timers," the trained and hardened miners, who did the pioneer work of the Rand, have passed, and a well-known ex-consulting engineer recently declared that the only real miners left were the native "boss-boys," who had been trained by the miners of an earlier day. If this fact of inefficiency being due to the lack of properly trained miners be admitted, it becomes a question of looking round for a supply of miners of the requisite skill. The *debacle* in the tin mining industry of Cornwall offers one source of such a supply. It is estimated that there are some four thousand experienced Cornish miners thrown out of work by the present position of the tin market. In the old days, of course, a big proportion of these men would migrate to the Transvaal, but to-day things are different, and Cornish miners have ceased to regard the Rand as a place of promise. In some quarters it is thought that the reason for this is the men's fear of contracting miners' phthisis, due to the magnified stories of the prevalence of the disease that have been disseminated throughout the Duchy. This belief we are satisfied is wrongly founded. The Cornish miners, we understand, are far less frightened of miners' phthisis than they are of being stranded in South Africa, should they come here and be rejected for underground work by the Miners' Phthisis Medical Board. That in a nutshell is the cause of their reluctance to come to the Rand. It has been suggested that the Phthisis Medical Board should delegate to qualified representatives on the other side the task of making an examination of Cornish miners willing to come here, with a view to eliminating at the source those who are unfit and otherwise unsuitable for underground work on the Rand. The scheme does not seem impracticable; and it may be that an experiment could be profitably tried with, say, 100 Cornishmen, and, if successful, repeated on a larger scale. The suggestion, to our mind, has much to commend it, and despite the obvious objections that would have to be overcome, emanating from Labour and other politically prejudiced quarters, we believe it would justify itself in a short while by reason of the era of increased efficiency it would introduce in the mining industry.

Notes & News.

ANOTHER BIG RHODESIAN, CONGO & MOZAMBIQUE NUMBER IN CONTEMPLATION.

The "S.A. Mining and Engineering Journal has in contemplation the publication of another big special Rhodesian, Belgian Congo and Portuguese East African number some time next year. The success which attended the publication of our first special Rhodesian, Congo and Mozambique number seven months ago has induced us to consider the advisability of publishing another and even more comprehensive number dealing with the great mineral industries of the North in a few months time. Our first special Rhodesian and Congo issue evoked warm praise and many letters expressing the hope that other similar numbers will be published have reached us. In the next special issue of this kind we hope to cover the whole expanding field of Rhodesian mineral industry, and to deal at length and in detail with the great Katanga region of the Congo Belge, the diamondiferous areas of the Kasai basin, and the Kilo-Moto Gold Fields.

A Cheerful View of the Outlook.

At the annual meeting of shareholders of the South African Breweries, Ltd., the chairman said that while the conditions in Europe and South Africa were bad at the present moment, trade must ultimately recover. South Africa was inherently sound, and the country was heavily mineralised. At present the surface had only been scratched, and even the Rand, the mining marvel of the world, was only a single spot on that vast continent. The company was fully equipped and able to take advantage of a turn for the better. The year was commenced with post-war troubles behind them. Regarding the Union Glassworks, the chairman said they had proved that native minerals were quite efficient, and he did not anticipate the necessity of importing any more bottles.

* * * *

The Silver Outlook.

Writing in mail week, a London correspondent says: "As the operations of many silver mining companies are tied up, owing to the low price and uncertain outlook of the white metal, views on the subject by experts like Messrs. Mocatta and Goldsmid are always welcome. At the moment the market is steady at 35¼d. per ounce, despite the large transactions which have taken place. China has both bought and sold heavily. For a time the spot quotation was higher than the forward, but at the moment of writing it was identical. This anomaly was due to Indian bazaar purchases for immediate shipment and forward sales against their purchases. China would appear to be buying to some small extent speculatively—on the other hand, some heavy sales from the Continent may come along presently."

* * * *

Base Metal Stocks.

According to the statement compiled by the Metal Exchange Statistical Department only slight alteration has taken place in the stocks of non-ferrous metals in warehouses at the chief ports of the United Kingdom. The quantities held both of copper and tin were increased to a small extent, but the accumulation of lead was reduced by 860 tons, and the supply of spelter (zinc) decreased 250 tons. The table given below shows the quantity of metal in warehouse at the end of June and May respectively:

	30th June. Tons.	31st May. Tons.
Copper (refined)	13,042	13,189
Copper (rough)	6,386	6,069
Copper (unclassified) ...	228	207
Total	19,656	19,465
Tin	5,934	5,737
Lead	13,278	14,138
Spelter	18,752	19,000

* * * *

Vryheid (Natal) Railway.

The report of the Vryheid (Natal) Railway Coal and Iron Company for the year ended 31st January, 1921, shows, after providing for Debenture interest, depreciation and all charges in South Africa and England, a profit of £33,158, plus £50,115 brought forward. The directors recommend placing £50,000 to general reserve, paying a dividend of 7½ per cent., carrying £5,717 forward. During the year £75,000 was received from the Government of South Africa for the purchase of Hlobane Railway. The receipt of this sum, added to funds in hand, enabled the directors to repay the Debenture debt, which would have become due for payment in 1924 at a premium of 10 per cent. The Debenture holders accepted repayment at a premium of 6½ per cent., and this premium, together with expenses, has been charged to capital reserve account. The capital of the company now consists entirely of Ordinary shares. The output of coal for the year was 363,418 tons, an increase of 24,927.

Developments at New State Areas.

We understand that trial pits are being sunk at the New State Areas with a view to the early erection of a reduction plant. The exact nature of this plant has not yet been decided upon, and investigations ascertaining the best ratio of stamps to tube mills are being conducted. It will be interesting to know what the results of these determinations will be, as there is a tendency in some quarters professing modern practice to decrease the ratio of stamps to tube mills as far as possible.

The following figures represent recent developments at the New State Areas:—Practically all work carried out during the June quarter was within the shaft pillars. North shaft —The total footage risen, driven and sunk, during the quarter was 1,605 feet, of which 579 feet were in drives, 359 in rises and winzes, and 667 feet in cross-cuts. Of the footage in drives, 82 feet were on reef, having an average value of 2.3 dwts. over 13 inches, and 355 feet were in the main connecting drive. South Shaft.—The total footage risen, driven and sunk during the quarter was 2.038 feet, of which 532 feet were in drives, 438 in rises and winzes, and 1,068 feet in cross-cuts. Of the footage in drives, 350 feet were on reef, having an average value of 44.5 dwts. over 24 inches, and 414 feet were in the main connecting drive. Note.—The rises and winzes at both shafts were all off reef, being in the nature of preparatory work at the shaft stations.

* * *

Prospects of a Trade Revival.

The prospects of a trade revival are naturally being discussed in many quarters in England. In a circular issued by the Central Council for Economic Information, it is stated that, with the resumption of work in the coal mines, experts are generally predicting a revival of trade provided industrial coal can be obtained at a low enough price. The question of cheap coal is now, indeed, of paramount importance, iron and steel manufacturers declaring that foreign competition cannot be met until they obtain fuel at 15s. or 20s. per ton. The following are among the opinions expressed by experts on the position:—Captain G. F. Jeanes, Assistant Director of the Imperial Commercial Association, states: "As far as we know, the countries of the world are all wanting manufactured goods. There should be plenty of orders. We have the factories, we have the men, and we have the coal now that the miners are going back to work again. The only thing for the revival of trade is Work, with a capital 'W,' and cheap coal. How greatly we need a trade revival is shown by the statement recently made to the effect that 28,000,000 people in Great Britain are receiving public assistance in some form or another. We certainly cannot continue doing this unless there is a trade revival." An official of the National Iron and Steel Manufacturers' Federation said: "There is a large world demand for steel, but it is potential rather than actual at the present. The whole thing is a question of price. Coal at 20s. per ton, or some say 15s. per ton, would go a long way to convert that potential into an actual demand." Mr. T. W. How, M.I.Mech.E., chairman of the Engineering Section of the London Chamber of Commerce, in an interview, said: "The general impression is that as the labour troubles adjust themselves there will be a revival in the engineering trade. It will, however, be very gradual at first, but I think it should culminate next year in something approaching a boom. The price of engineering commodities will sympathetically recede with decreased working costs. The question of surplus stocks, manufactured under conditions of high costs, may perhaps present initial difficulties in bringing down prevailing prices, but I think there will be a tendency to reduce profits and dispose of existing stocks expeditiously in order to create room for further production. Once the demand is created it is the wisest policy further to stimulate that demand by, whenever possible, a system of mass production, by which the prices of commodities can alone be lowered, and thus preserve, or even strengthen, the wage status of the workers."

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining

Blasting With Liquid Air.—Mining and Scientific Press, June 18, p. 843.

The Chuquicamata Enterprise.—Mining and Scientific Press, June 18, p. 831.

Firedamp Explosions.—Canadian Mining Journal, June 24, p. 494.

The Safety of Electric Locomotives in Mines.—The Engineer, July 8, p. 47.

Engineering.

Modern Marine Oil Engines.—The Engineer, July 1, p. 3.

Steam v. Electric Winding.—The Colliery Guardian, July 8, p. 96.

The Utilisation of Exhaust Steam in Turbines.—The Colliery Guardian, July 8, p. 96.

The Engineering Conferences.—The Engineer, July 8, p. 31.

Fifteen Hundred cubic feet Mixed Pressure Turbine-Driven Compressors.—The Colliery Guardian, July 8, p. 95.

Metallurgical.

The New Surface Plant for the United Verde Copper Company.—Mining and Scientific Press, June 25, p. 873.

Manufacture and Uses of Tungsten.—Mining and Scientific Press, June 25, p. 879.

Economics.

The Mining Stoppage.—The Colliery Guardian, July 8, p. 103.

Labour and Wages.—The Colliery Guardian, July 8, p. 104.

The Effect of the War on Mineral Supplies.—The Colliery Guardian, July 8, p. 97.

Oil and Coal.

Anglo-Russian Activity in New Brunswick Oil Shales.—The Canadian Mining Journal, June 17, p. 474.

Industrial Alcohol from Rice Straw.—The Engineer, July 1, p. 8.

Fuel Problems of the Future.—The Colliery Guardian, July 8, p. 100.

Steaming in Gas Retorts.—The Colliery Guardian, July 8, p. 110.

Powdered Coal Fuel.—The Engineer, July 8, p. 38.

The Fuel Research Station.—The Engineer, July 8, p. 42.

How Trolley Carrier System Handles Coal.—Coal Trade Journal, June 29, p. 767.

LATEST METAL QUOTATIONS.

According to London cables dated July 30, the Metal Market was quiet during the week, under the influence of the holiday season. Some disappointment was caused by the indifferent manner in which consumers responded to the more favourable financial position.

A very small volume of business is being done in copper, and, on the contrary, in view of the curtailment of production, a serious setback is hourly expected.

Tin was dull owing to the expectation of an unfavourable statistical position. English producers, who are gradually recovering from the effects of the coal strike, are again in the market, and the supplies for them are ample. It is expected that there will be a demand from the tinplate mills, which are in course of restarting.

While lead is easier, owing to buyers holding back, the position is unaltered.

Spelter shows a slight improvement in demand from consumers, but producers refrain from offering, as they consider present prices unremunerative.

Silver, which was quoted at 39¼d., has advanced on the Indian bazaars becoming keener buyers.

Concerning Mines and Men.

Mr. Owen Letcher, editor of the *S.A. Mining and Engineering Journal*, is leaving Johannesburg for India on Monday. He will be absent from South Africa for three months.

* * * *

Mr. C. F. Delfos has left on a brief business visit to England, and expects to be back by the end of the year.

* * * *

Lord Oranmore and Browne, chairman of Henderson's Transvaal Estates, is on his way to this country to pay a visit to the properties in which his company is interested.

* * * *

Owing to ill-health, Mr. W. H. Mardall, for many years secretary of the Johannesburg Consolidated Investment Company Ltd., is proceeding on six months' leave of absence, and will then retire from the service of the company

* * * *

The death took place at his residence, Westcliff Drive, Parktown, on Saturday last of Mr. J. K. Digby, late manager of the Aurora West G.M. Co., Ltd. Mr. Digby was well known and highly esteemed in mining circles throughout the Rand. Among the many wreaths sent were tributes from the Chamber of Mines' laboratory department, the manager Aurora West G.M. and employees, Aurora West G.M. underground employees, Aurora West G.M. staff, Government Training School, and the Mayor and Mayoress of Roodepoort.

The Fuel of the Future.

At the recent conference in London of the Institution of Civil Engineers, Mr. Thomas Cook read a paper in the section devoted to mining and metallurgical processes, on the effect of the war on mineral supplies. Although, he said, output of iron ore, and consequently that of manganese ore, dropped very substantially, there was a remarkable increase in the output of nickel, chromium, vanadium, and tungsten. The latter might be aptly termed " economy " metals, for the extensive use of nickel and other alloys no doubt effected much economy of material, while the remarkable increase in tungsten output must have had a very important effect in economising labour. The remarkable progress in oil output, taken in conjunction with the decline in the coal output, raised the question as to whether oil was not likely in the near future to become as important as coal for power production. Oil reserves were regarded as very small in comparison with those of coal but their knowledge of oil reserves was somewhat speculative. Moreover, the world had large oil shale resources, and it was possible that these should be drawn upon to a large extent in the near future. Sir Richard Redmayne, who presided, said that probably one of the fuels of the future would be a combination of both oil and fine coal-dust, whereby they could obtain the same thermal value as oil, bulk for bulk, but not weight for weight. Of course, the quantity of the world's available oil resources was an unknown factor; but they knew that oil fuel was more rapidly exhausted than coalfields, though it would last our time.

The Lesson of the Far East Rand.

HOW THE HISTORY OF THE RISE AND PROGRESS OF THE EASTERN GOLD FIELDS HAS A MORAL FOR THE WEST RAND.

[By W. P. Taylor.]

In this article Mr. W. P. Taylor sketches the history of the Far East Rand and shows how it should encourage those interested in the Far West to persevere in their efforts.

It was Paul Kruger who played the big game of no trumps when Britain called on him; for, fortified with spades, diamonds and hearts, he knew his enemy had but indifferent clubs, and so he burnt his boats and went the lot. At the time, of course, he was summarised as a glorified optimist. Well, he had grown out of the veld. As he told Lord Abercorn when he heard his wonderful lineage, "Zeg voor hom mij vader was 'n schaap wachter" ("Tell him my father was a shepherd"). But he was a shepherd of men. Kruger and Botha were both shepherds, and they commanded the hearts of their comrades. There was no breath of undue optimism in Kruger's decision; he had seen the rocks removed from the highway, the trees felled to cut roads. With him came the first glimpses of white civilisation, and with the hardihood of a Pizzaro he cut his way. A born observer, he knew his country was self-supporting, and who can prove him wrong? When one sees how, in the late Boer War, Britain drew on the world to support her troops, and the Boers kept the game going—on what, if not on the resources of their country and their rifles? And then, when the struggle was over, how quick the resuscitation! Optimism based on facts is a simple matter, but it is another thing to go blind on an indifferent hand, and I cannot see how the country can go "No trumps," as it apparently is doing to-day. It was Carlyle who shocked and offended Her Gracious Majesty the late Queen Victoria in his graphic picture of a House of Lords without clothes; the matter of humanity's impotence *sans* rags, and leather, he proved to the hilt. Now here I would not say let us derobe, but let us undo a few things and see how near we have been to crossing the rubicon. What, for instance, would have been the condition of this country without diamonds and gold? Without the diamond all that vast stretch from Cape to the Vaal would not have paid for railway traffic. It would possibly never have got beyond sheep, and that at the rate of a sheep to 10 acres is by no means a stirring proposition. Then the world would have been without one half of its seductive finery: but here, without the Rand, there would have been a Dutch Arcadia. Kruger's ideal might have carried through. The world, again, would have missed much. How many great schemes would have died untried? Without the immense strength of Transvaal gold would the world have solved its currency? Gold might have risen to £10 an ounce. The Hindoo might have bought and buried, and currencies might have ruined development, just as the present scarcity has upset the normal conditions of the day. Production has advanced to unprecedented heights, but would production have continued in face of the terrible gold scarcity the world would have witnessed without this gold? Paper—ah, yes, paper. What we have of paper is already too much. The world is full of paper. In Poland they give you 6,000 roubles of paper for £1 of gold; but will Russia rehabilitate itself with paper? And, coming nearer home, how long will it take Germany, Italy and France to come to par? Without the Rand would the world have built up its latter-day development on paper? Still how near, how very near, might we not have been to paper trouble. In the Far East Rand there has been an abnormally rich gold development. Geologists call it a channel, a deep, rich syncline, or many synclines, and marvellous gold. Did the surface of that country indicate these wonderful values? When the area now controlled by the Government Area Gold Mining Company and mined by the Consolidated Investment Company was thrown open to tenders were the consulting engineers of the various groups aware of the phenomenal width and value of the reef in this area? As far as I remember, the opinion was a narrow reef with medium values. New Modderfontein itself struggled under non-dividend-paying conditions for many years, and yet both went "no trumps" and won. When the Rand was discovered a man on horseback could have galloped along the outcrops and secured the reef. Some did; but in the Far East Rand it was a different matter. When I went out to peg the Van Ryn Deep ground there was nothing but veld and the gamble. The Apex, which we all thought the pick of the bunch, let us down badly. The Benoni and Kleinfontein turned out medium mines, and a terrible long stretch back, from the East Rand Extension and Boksburg mines to the Blue Sky, were all failures. But, strange to say, the ventures to the far east picked up the gold—that long intervening line we had lost. The courage of the Barnato, Goerz and C.M.S. groups was well rewarded, for they found gold beyond their expectations. The Modder group improved marvellously upon development, and a new era of great prosperity became assured. But for the courage of the houses would this have eventuated? And if it had not eventuated, what kind of a Rand would there have been to-day? I venture to say there possibly would not have been 100 members at the Rand Club. There would have been no labour troubles, and there would have been a lot more paper and less gold. I do not intend wasting time speculating on the thousand and one things that might have happened, but as it was, several great mining concerns went "no trumps" as they say in the States. They won out. Yet mining is precarious; it is by no means a certainty. There was a certain amount of pluck about it; the indications never warranted it, but it grew on the great search. There is an old Dutch story of two students at an inn who had no money to pay their bill. One of them conceived the idea of fastening their genial host to the clock, and so he bet him ten guilders he would not sit in front of his

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great clock and, following the pendulum with his pipestem, say, " Backwards and forwards: here she goes, there she goes." With their bill unpaid they bade him adieu, and though servants came panting with the news that the students had fled, he stolidly continued, in fear of losing his bet, " Backwards and forwards: here she goes, there she goes." And so it goes with us to-day. There are too many of us watching the clock, and we will never get any further at the game. Conditions will steal off with our gold and we will be left. There really is nothing new in all I am saying. Everybody knows this is one of the richest countries in the world. Its land is untrammelled by forests, " clean " and ready to produce. It is not buried in snows and frozen five-foot deep in winter. There is labour everywhere. Its coal resources are computed at 56,000 million tons. Put into its true potential value in calories and by-products, it would be worth perhaps £100,000,000 million sterling; burnt as it is to-day it might return £10,000,000 million sterling. It is a great asset. Then there is oil in shale, and scattered minerals. There is a great diamond industry, and there is America. America has to find outlet for capital; this Union will attract that capital, for by all the laws of gravity and attraction they are the two parts concerning each other. In recent years American interest has become apparent in trade and mining here; it will become more and more apparent. I trust that it may show the way to open the Far West Rand, and I am sure it will show us the way in diamonds, for I venture to predict that within ten years America will control every diamond mine in the world. The thing is so obvious—it is one of the finest outlets for capital, and under its wonderful control and management there is no end to the possibilities. There are many things that might happen, but such an entry of capital will require safeguards and assurances. Formerly the introduction of American capital into our gold mines was held up through fears of increased taxation. There is, in certain quarters, more trouble over it than the taxes are worth; it could all be easily remedied by having a fair land tax and resorting to assessments, where bookkeeping is onerous. We all have to follow precedents sooner or later, and there are worthy precedents to follow. The bitterness of politics so often results in the use of power to exploit. Exploitation is pernicious and its effects retrogressive. Not only do the opposite parties suffer, but its effect upon foreign capital is instantaneous. No; exploitation in any form is small and mean. But here is the country that Paul Kruger went " no trumps " on; its vast resources are untouched. Seeing the marvellous results that attended the workings on the Far East Rand, I am optimistic enough to fearlessly advise the opening up of the Far Western Rand. I am optimistic enough to anticipate the opening up of reefs in the underlying and overlying strata of the whole of the Rand, and I venture to think that had Paul Kruger lived and directed the affairs of this Union he would have foreseen the many evils that it is faced with if every effort and support is not given wholeheartedly by all who live in this country to the opening up of new mines and the great resources of this country generally. In fact, it is most necessary to do what he did—take our coats off, trust the country, and go " no trumps."

Coalite.

At a recent meeting of the Royal Society of Arts, Professor H. E. Armstrong dealt with the use and abuse of coal as fuel, and outlined the early history of coalite. Early in 1913 a large German company was about to associate itself with the English undertaking, but the War intervened, and it was not until 1919 that development work was resumed at Barnsley. A carbonizing plant built to the design of T. M. Davidson had been in operation since November, 1920, and was undoubtedly a success. The trouble due to expansion of the fuel on carbonization had been overcome by building the ovens with upright walls and fitting them with perforated hanging plates movable in a vertical plane over a narrow range; the coal was filled into the space between the side of the oven and the opposed face of each plate, thus enabling the width to be varied. During carbonization the plates exerted pressure on the coal, and the volatile matter escaped through the perforations. When carbonization was complete, after 5 to 8 hours, the coalite slabs were allowed to fall into an air-tight water-cooled chamber. It was essential that the coalite should not be exposed to air during cooling. The product contained 10 to 15 per cent. of volatile matter and burned with a bright flame; the coal-oil was well within the Admiralty specification for fuel oils; and motor spirit could be obtained from the liquid and scrubbed from the gas.

In the discussion that followed, Sir Arthur Duckham said that the great drawback to the process was the lack of an absolutely satisfactory balance-sheet, and this was the reason why gas-engineers had fought shy of it; the success of the process would depend on the value of the coalite and the value of the oil. Dr. J. A. Harker said that in an investigation carried out under the auspices of the Ministry of Munitions, it was ascertained that from one ton of coal the yield of crude coalite was 14 cwt., of which rather less than 13 cwt. was saleable. Economically, the process depended upon selling the 13 cwt. for the same price as that paid for one ton of coal, and of paying operating costs from the sale of by-products. He thought that the margin between profit and loss would be very narrow. Among the points raised by subsequent speakers were the friability of fuel produced by low-temperature carbonization processes and the necessity for briquetting, the economy that should be obtainable with the Neilson process of internal-heating of the retorts with water-gas, and the need of eliminating as much ash as possible by properly washing the coal. In his reply, the author of the paper stated that the public should be prepared to pay more for coalite than for coal because it did not burn away so rapidly and was smokeless. The yield of fuel oil by carbonization was about 1 ton from 10 tons of coal.

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Rock Drills and Miners' Phthisis.

DRASTIC RECOMMENDATIONS OF THE LATEST MINERS' PHTHISIS COMMISSION'S REPORT—CERTAIN DRILLS CONDEMNED.

The following extracts from the latest, interim, report of the Miners' Phthisis Commission, issued last week, deal with the all-important question of drills in use underground and their dust-creating effects.

Dealing with rock drills and phthisis, the recent report of the Miners' Phthisis Commission recalls that with regard to the various drills in use, the Government Mining Engineer in his annual report for 1919, at page 74, reported as follows:—"The ordinary reciprocating drill and the solid hammer drill were practically the only types in use until a few years ago. With both types the application of water under pressure by means of a narrow metal tube, or in feeding water through the point of the drill, resulted in satisfactorily preventing the formation of dust. Within recent years a new type of machine has, however, appeared which is open to objection. In this type of machine, the hole is cleared by allowing air from the machine to blow through the hollow jumper to the bottom of the hole. The application of external water does not adequately prevent dust, since it appears that the bottom of the hole, especially when it gets fairly deep, remains dry, and the dust penetrates to the outer air, enclosed in the bubbles which rise to a rapid stream through the water. These machines are of the dry jackhammer type and their use should be prohibited.

"In another type, the Leyner drill, both water and air are fed through the hollow jumper. This machine is satisfactory when in perfect order, but, as was pointed out in the final report of the Miners' Phthisis Prevention Committee, it contains certain fragile parts, the breaking of which does not diminish its drilling capacity, but does interfere greatly with dust prevention. As the dust produced is very fine and not ordinarily perceptible, the operator of the drill is not aware that anything is wrong, and goes on drilling as if nothing were happening. This machine thus constitutes a danger to health like those above mentioned, and should be discarded in favour of safer drills, even if the speed and economy of drilling suffer." . . .

"During the year a committee of miners of the Mine Workers' Union examined into the merits of the Swift Drill Attachment, and came to the conclusion that, owing to its efficiency, simplicity and solidity, it was preferred to machines like the water Leyner, which the committee condemned as being beyond the capacity of the ordinary miner to put right when out of order. As a result of a recent joint meeting of representatives of the Chamber of Mines, the Mine Workers' Union and the Department of Mines, it was proposed to carry out a test with 100 of these attachments, the patentees foregoing their royalties during the time of test. The Chamber of Mines has, however, requested that further consideration of the question should stand over until some tests of this drill and others which are now being carried out have been completed."

"Jackhammer" Conversion.

We were informed that the tests referred to in the latter part of this extract have not yet been carried out, but that agreement has been reached between the Chamber of Mines and the Mines Department to convert all "dry jackhammers," i.e., machine passing air only through the jumper, into water-feed machines by March, 1921. How necessary this step is, was evidenced by the case of a sinking shaft on the Nourse Mines where extremely bad dust samples were obtained for dry jackhammer whereas exceedingly good samples were obtained when the same drills had been converted into water-feed machines, although in both cases the holes were practically being drilled under water. An important point to which due attention should be paid in converting such machines is the size and position of the aperture through which the water passes. This is exemplified by a case reported on in a systematic inspection of the Van Ryn Gold Mine to the effect that "a large proportion of the hollow steel used is unsatisfactory, owing to the eccentricity of the hole or its small diameetr. Both defects result in an insufficient volume of water reaching the cutting edge, with the result that an undue amount of dust escapes into the air."

The Leyner Type of Drill.

With the conversion of the machines passing air only through the steel into water-feed machines, one dangerous type of drill will have disappeared. There now remains, however, the Leyner and similar types of drills which pass air and water through the hollow jumper, and the solid steel type where the water is supplied by a water hose.

Now the evidence before the Commission points to the fact that the Leyner Drill is the most efficient on the market as far as drilling is concerned, but it also confirms the opinion of the Government Mining Engineer that it is the most dangerous. This view is shared by the Miners' Phthisis Prevention Committee who as far back as the 10th Januarry, 1919, in its final report (page 187) made the following recommendation which we endorse: "The use should be prohibited of any water-feed machine which is in such a condition as to lead to the inadequate prevention of dust." The Committee refers to paragraph 110, which reads as follows: "The Leyner drill cannot, therefore, be regarded as quite satisfactory. It is certainly not 'fool-proof' and its internal construction is somewhat too complicated for the ordinary miner to put right when not in order, or even know when it is not in order. It is necessary that the supervision over these machines should be particularly stringent, that they should be frequently inspected and overhauled, and that the feed water used for them should be up to standard (see paragraph 71). To supply and use a machine in which the parts affecting the water-feed are out of order should be made illegal."

On account of their rapid drilling capacity, Leyner drills are nearly always used in development work, consequently in closed, confined spaces. They make little dust when the water pressure is high, and the tube fitted in the machine to lead the water into the jumper is in order. If, however, the water supply is cut off, the machine will continue to drill, when the amount of exceedingly fine dust formed is very large. On account of its extremely minute size much of the dust produced is not perceptible to the naked eye and therefore doubly dangerous. This is graphically depicted in a film produced in connection with the campaign for eradicating miners' phthisis. Your Commission was shown this film at a private exhibition and was impressed by the striking manner in which it showed the large amount of exceedingly fine dust produced when drilling dry even for a few seconds only. Moreover there is another danger in the Leyner drill, every witness who has worked the machine testifying to its "fogging" propensities. This saturating of the already humid atmosphere by "fogging" constitutes a menace to health apart from the dust caused in drilling. We have been pressed to recommend that the use of these machines should be entirely prohibited. We, however, hesitate to recommend such a drastic step owing to the large number of this type of machine now in use on the Rand, the discarding of which would cause a serious dislocation of the industry. We, however, are of opinion that no further installations of machines of this type should be allowed unless great improvement is shown both in regard to dust prevention and "fogging." And failing the necessary improvements being made we would endorse the opinion of the Government Mining Engineer that "this machine should be discarded in favour of safer drills even if speed and economy of drilling should suffer." A reasonable time to effect this would have to be given to the mines, the time to be determined by the Government Mining Engineer.

Solid Steel Drills.

We also wish to remark upon the large number of machines using solid steel jumpers still in use. Here an equally strong if not stronger case can be made out for prohibition. The great objection to this type of machine is that the laying of dust is entirely dependent upon the human factor in the form ot a native applying water through a hose to the hole to be drilled. Not only is the native not aware of the dangers attendant upon his neglect in using water, but he is often compelled to such neglect by having his attention called to other matters such as attending to drills stuck in a hole (in which case it is customary for him to hammer the drill with a 4lb. hammer), to fastening and loosening bolts on the clamp, arm and bar of the machine, and to tightening up the bar itself, all duties which have often to be performed while the machine is drilling. Meanwhile the hose is usually lying idle next to the machine. All this is aggravated by the fact that the natives are working under contract and are paid according to the number and depth of holes they drill, and furthermore are without direct supervision during the greater part of the drilling shift. These facts are borne out by a number of witnesses who have appeared before your Commission.

Moreover, the difficulty of an entire replacement of the machine has not got to be overcome here as would be the case in the machines of the Leyner type. For according to the opinion expressed in paragraph 111 of the final report of the Miners' Phthisis Prevention Committee, at least one practical appliance, the Swift, for converting the present solid steel machines into water-feed machines is obtainable at a fairly low cost. In the opinion of your Commission it is most desirable that all machines in use should have a satisfactory automatic water-feed at the earliest possible time. There is, in the opinion of your Commission, no reason to allow a type of drill of so potentially harmful a character as the solid steel type, to remain in use when means of conversion to the water-feed type are to hand at a reasonable cost. We examined the Swift device both on the surface and underground, and in both cases it appeared to confirm the view expressed in paragraph 111 of the final report of the Committee referred to above. There is another device, viz., the Ferreira, which we have not yet examined. The relative efficiency of these appliances and the comparison of costs involved are matters that should be left to the technical advisers of the mining companies and the Mines Department. We are satisfied, however, that this important improvement can be effected at a comparatively low cost, provided that the mines are given sufficient time in which to convert these solid steel drills to hollow steel. After that, in the opinion of your Commission, no solid steel should be permitted to be used.

Furthermore, in view of the experience that drills which are detrimental to health have been introduced in such large numbers that the Department is now unable promptly to stop their use without causing very serious economic loss, we are of the opinion that in future no drill should be used in a scheduled mine without the prior approval of the Department.

Machine Stopping Device.

It has been stated in evidence before your Commission that a device has been invented for cutting off the compressed air from the machine when the water fails, thereby stopping the machine automatically. As far as we have been able to ascertain, this device has not yet been put into use, and we were informed that the inventor was keeping the device a secret pending a reward being offered for such an invention. We need hardly point out that with all machines water-fed and such an appliance in general use, dry-milling and contravention of drilling regulations in this respect would be impossible. We therefore consider it very desirable that this or any other appliance of a similar nature should be made available at an early date, e.g., by the offer of a suitable award. With this object in view the Commission approached the Chamber of Mines on the question and received the assurance that the matter is receiving their attention.

Collaring.

Another matter to be considered is the excessively large quantities of dust caused in collaring or starting holes by all types of drilling machines. The axial water-feed machines usually have not a sufficiently large jet of water issuing from the steel to cover the whole surface of the collar. Moreover, there is no recess on the face of the rock during collaring which the water may lodge in, and the end of the steel is continually sliding and moving about until the hole is an inch deep or more. The invariably high dust samples obtained during collaring indicate how necessary it is to have a better supply of water for this operation. On one or two mines an extra hose is used while collaring with very beneficial results. The expenditure involved is but trivial compared to the benefit derived; we therefore recommend that all axial water-feed machines be provided with such additional hoses which shall be used during collaring.

Here the question arises of recommending amendments to the Mining Regulations in order to give effect to the conclusions arrived at, and your Commission proposes that provision should be made as follows:

(1) No new type of machine drill may be used on the scheduled mines without the prior approval of the Government Mining Engineer, or may be continued in use unless that approval is ratified by him within one year and after at least (20) of the machine drills so provisionally approved have been in regular use on the scheduled mines to his knowledge for a period of six months.

(2) The Government Mining Engineer may prohibit the use after a specified date of any type of machine drill in use on any scheduled mine and the introduction into the scheduled mines of any further machine drills of that type unless in either case that type is before that date altered so as to be in his opinion fit for use on the scheduled mines.

(3) Any employer may appeal to the Minister against any refusal by the Government Mining Engineer to approve or to ratify the approval of a new type of machine drill, or against any prohibition by him of any existing type of machine drill unless altered within a specified time, and the decision of the Minister shall be final and conclusive.

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Geological Society of South Africa.

DR. ROGERS REPLIES.

At the monthly meeting of the Society, held in the Main Hall, Scientific and Technical Club, last week, Dr. Rogers replied to Mr. W. Bleloch's previous meeting criticism of his (Dr. Rogers') paper, "The Geology of the Neighbourhood of Heidelberg."

Attached is a report of Dr. A. W. Rogers' speech:—

Dr. Rogers said:—In my paper on Heidelberg certain publications by Mr. Bleloch were criticised for the purpose of showing that he had no sound basis for certain correlations he had adopted. After the paper had been read, Mr. Bleloch admitted many errors without, so far as I know, specifying them, though he said that his correlations of reefs were correct. At the last meeting of the Society he apparently withdrew part of the admission, and he maintained the unconformity of the Ventersdorp System on the Witwatersrand System in Heidelberg. His evidence for this opinion was (1) that there is an unconformity in that position in Bezuidenhout Valley; and (2) that he took from Dr. Hatch's map the geology of certain areas which he believed to be correctly represented on that map.

With regard to the first point, Bezuidenhout Valley is not in Heidelberg, and Mr. Bleloch has produced no evidence to disprove the conformity at the base of the Ventersdorp System between the northern slopes of the Klipriversberg and the Malan's Kraal-Tweefontein escarpment. In my paper evidence on this important point is given in some detail, and it justifies the statement that the Elsburg-Ventersdorp junction in the area described, from Grootfontein in the north-east to Goedeverwachting, and again from Elandsfontein to Tweefontein on the south of the Sugarbush Fault, is as good an example of conformity between dissimilar, stratified and unfossiliferous formations as can well be imagined. Mr. Bleloch said that he did not know that one system can overlie another both conformably and unconformably, and he seemed to think that the existence of conformity and unconformity between two systems was an entirely new discovery. Had it been so, that would not disprove its occurrence; in the natural sciences the only right course to pursue is to make accurate observations and to base one's conclusions on those observations, not merely upon what has or has not been described before. I will, however, give for Mr. Bleloch's information a few instances of one formation lying both conformably and unconformably on another, that had been described and mapped before I began to work in Heidelberg.

In 1911 Dr. Mellor read a paper before this Society entitled "The Normal Section of the Lower Witwatersrand Sysetm, etc." On pp. 119-122 he discusses this very relationship as regards the Elsburg beds and lower strata in the Witwatersrand System, showing that no unconformity had been found where these beds lie in the Upper Witwatersrand System, though they are lying unconformably on the Lower Witwatersrand beds at Langerman's Kop. The discussion is illustrated by clear diagrams. But Dr. Mellor was not the first geologist to believe that one system could be both conformable and unconformable to another, or even that these relations could exist between the upper and lower parts of one system.

Another instance from South Africa is described at length in the publications of the Geological Commission of the Cape of Good Hope as well as elsewhere; it is the conformable succession from the Cape System to the Karroo System in the Ceres and Great Karroo and the unconformity between them north of the Ceres Karroo. But the men who found out that were not the first to observe the existence of unconformable overlap.

The basis of the arguments used by Edward Suess in his book, "The Face of the Earth," for the changes which have taken place in the distribution of land and water, is the existence of these relationships between succeeding formations. What he called positive displacements of the strand are evidenced by extension of deposits beyond an area where there is conformable sequence downwards into older rocks; and there is of necessity a belt along which that older group had been exposed to denudation but had not been entirely removed during the preceding negative phase; in that belt an unconformity between the two must have been produced. That book was published between 1885 and 1909, but its author was not the first geologist to record the observations, though he probably made more extensive use of them than any one man before him.

The transgressions of Jurassic and Cretaceous times, proved by the unconformable overlap of beds from areas where there is conformable sequence, are perhaps the best known and longest studied instances; some of them are shown even in William Smith's map of England, published in 1815.

So it is clear that in giving detailed evidence of the conformable sequence of the Ventersdorp System on the Witwatersrand System in Heidelberg, while there is unconformity in Bezuidenhout Valley, I cannot claim to have discovered a new class of facts; that discovery is already more than 100 years old.

Mr. Bleloch pleads that I must admit that "the apparent conformity at Heidelberg is only accidental"; if he means by this that the apparent conformity represents a period during which erosion took place in that area, I most emphatically do not admit it, because the passage beds described in my paper are found wherever the horizon is exposed to view. He may, however, attach some other meaning to his phrase, which he does not explain.

It lies with Mr. Bleloch to prove his contention that there is unconformity at the base of the Ventersdorp System in Heidelberg; he has done nothing toward it yet.

With regard to the second point, I understand that he has not examined the area in question; he is not, therefore, able to form an independent opinion about it. He accepts another "reading" and says that my map is wrong. It is not a question of "reading," but it is one of fact, the recognition of a variety of rocks and their relation to Ventersdorp beds south of the Sugarbush Fault. I have shown that on his map the Ventersdorp beds are represented as extending several miles north of their actual limit in that neighbourhood; and the matter stands there.

It is obvious that Mr. Bleloch's two criticisms of my work suffer from that lack of objectivity to which I drew attention in his map of 1910; for one of them is a statement that an unconformity exists in another area, an area in which I have most certainly never denied its existence; and the other is that he believes some other "reading" of the geology of an area which he has not examined is correct. In that case he has fallen into great error through blindly following a mistaken authority; if, however, I misunderstand him, and if he has examined part of the area in question, then he has, as I said was possible, fallen into the error by accepting a mistaken authority in spite of having seen the various kinds of rocks in that area.

I have not charged Mr. Bleloch with plagiarism; if I had, it would only have been necessary for him to point to his acknowledgment of work which he had copied in order to refute the charge.

It is of importance in scientific work to acknowledge sources of information, not alone for general reasons, but to enable others to estimate the validity of the work.

Mr. Bleloch did not understand why I apologised for discussing the wrong correlation at length before this Society; the reason was clearly stated at the time, and there should have been no difficulty in understanding my statement.

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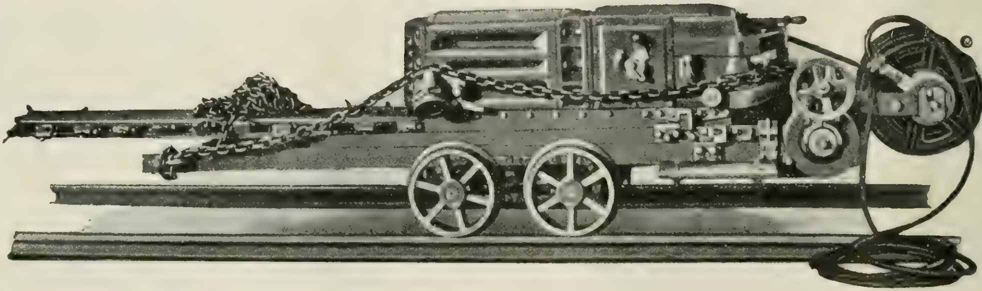

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The Beginnings of our Goldfields: A Pioneer's Recollections.

By Arthur Stenhouse.

The articles which have recently been appearing in this Journal on the early days have attracted widespread notice. The romance of mining is a subject which is full of interest for all of us, and there is particular satisfaction for our older readers in going back over the years to those glamourous times of the late 'eighties, when the wondrous riches of the Transvaal gold fields first began to attract world-wide notice. The following article is an abstract of recollections published some time ago in the "Star." It is written by Mr. Arthur Stenhouse, the well-known mining machinery merchant of this town, who was the secretary of the first gold mining company floated in the Transvaal. Mr. Stenhouse's article is brightly written and it will, we are sure, engage the attention and interest of many of our readers.

In 1886—it seems but yesterday—across the trackless veld we drove the mules to seek our fortunes on the newly-discovered Witwatersrand goldfields. At the home of the late Dr. Rutherfoord Harris (who afterwards was appointed secretary of the Chartered Company, and later on was elected a member of the House of Commons) we were welcomed, and in his tent we tarried. The Kaffirs cooked our food on the antheaps which everywhere abounded. By day we tramped across the hills in search of gold, and sought for samples of conglomerate. In the evenings we crushed and panned the quartz collected in our wandering, with wonderful results. After a simple supper of mealie meal and coffee we squatted round the fire and smoked the soothing pipe, at intervals discussing prospects of relieving suffering humanity throughout the world with our prospective millions. The early pioneer had big ideas and built many castles in the air: we were all optimistic, and pessimism was an unknown quantity in those far-off days.

Personally, we had pegged our 12 claims on the Main Reef, which we worked for many months with grand results: visible gold everywhere. But incomers had little faith in the permanency of the Witwatersrand goldfields; all eyes at the time were centred on the De Kaap goldfields. In vain we offered to sell all our claims for £100, but no buyers were forthcoming, and eventually, for want of funds, we reluctantly abandoned these claims and let our chance slip by

Half a Million Lost.

Long afterwards the second comers repegged those claims and floated a company (the "Evelyn," now long since dead) with a capital of £100,000. The shares were boomed up to £6, and thus we missed our chance of making a half million. We were not singular in that respect; the majority of the early pioneers missed their opportunities and became in time resigned to their misfortune? Is it not better to have loved and lost than never to have loved at all? Figuratively, this was our consolation.

* * * *

One day the news spread wildly forth that there was a lady in the camp, and there was great excitement amongst the "boys." Prospectors borrowed horses, donkeys and mules or tramped across the barren veld beneath the burning sun to gaze once more upon a member of the gentler sex. Her name was "Cockney Liz." Camp life had deadened our susceptibilities and we pined once more for the refining influences of female society. From far and near we assembled at Lizzie's tent to do homage to our Queen. That night we had a dance upon the veld outside her canvas residence. The lady danced a solo in the centre, and the men danced around her in a circle—a weird performance on that moonlight night. Picture to yourselves the scene. Antheaps for our seats, the sky our covering

* * * *

So days passed by. Sometimes in the silence of the night we recalled the memories of our last camping ground: a hut of rough-hewn logs and "muskeg" moss, in a dense forest of tamarac, spruce and cedar trees, midway between Lake Superior and Hudson Bay—awe-inspiring and soul-uplifting was the intense silence of that great lone land, so rich in timber and minerals.

* * * *

At Pretoria we were appointed secretaries of the first gold mining company floated in the Transvaal, "The Kromdraai" (Pretoria, 1887). (De Kaap gold mining companies had been floated in London prior to this date.) Mr. Henry Nourse was chairman of the company, the late Captain Dow was a director, with Mr. R. R. Hollins and others. The company had a 10-stamp battery worked by water power. The rich pockets of gold found at this mine have never been excelled anywhere on the Witwatersrand. What say you to that, ye mining experts?

On the way to the Gold Fields in the early days.

* * * *

When the late Mr. Knight floated his company (Knights) in Pretoria, with a capital of £240,000 we thought it was an enormous capital, and Mr. Knight had to take up the majority of the share issue himself. What a contrast from to-day, when companies are floated with a capital of a million pounds or more! Surely truth is stranger than fiction.

Pretoria in those far-off days (1886) was a charming little town. The streets were shaded with majestic blueguns, and in the shadow of the trees running streams of purest water made music in the pleasant summer-time; the white-washed thatch-roofed cottages were surrounded with scented briar and were shaded by peach and orange trees whose blossoms breathed forth sweet perfumes to the passer-by. No railway trains, no motors or horrid trams disturbed the peacefulness in those early days.

The coach journeys before the advent of the railways in the Transvaal were interesting. On one occasion I travelled by coach from Johannesburg to Vryburg, Bechuanaland, a two days' journey across the veld. On our way the coach was stopped by an enormous herd of springbok. The driver produced his gun and fired amongst them at close range, but not a buck did he shoot. It seemed incredible, as they were so closely packed in their mad career.

* * * *

The first telephone on the Witwatersrand goldfields (as far as I know) was one erected by Mr. Hubert Davies, at that time employed as assayer to the Jumpers Gold Mining Company, connecting the Jumpers' battery with the mine office. The wires were carried from a post through the roof of the office buildings. When the wind was blowing there was a continuous buzzing, which was absolutely unendurable. As resident secretary, I remonstrated, but obtained no redress; eventually I obtained a ladder and severed all the wires. When the manager (Morrisby) arrived next morning he noticed that these wires were disconnected, Naturally, Mr. Davies was very much annoyed. The following day he arrived at the office, carried the wires down the post, placd them underground and through the floor of the office to the desk, and, naturally, there was no "buzzing" thereafter. Telephonic communication was then in its infancy, and Hubert Davies and myself have been the best of friends since this occurrence.

* * *

In those early days the output of gold from the mines was regulated by the directors. The output for the month would be determined at the beginning of the month, and the managers regulated the daily returns accordingly. Every morning the mine captain would arrive at the office for instructions; the mine assay plan was before us, and the captain was instructed to stope the ore. It was really quite a simple matter. The directors would be aware of the current month's output a month earlier than the general public. Possibly the same procedure obtains to-day.

* * *

With regard to the purchase of stores, the storekeeper would furnish the resident secretary with a list of monthly requirements (coal, dynamite, drill steel, picks and shovels, etc.), the merchants would send their travellers out to the mines very early in the morning on the first day of every month, and at 7 a.m. there was quite an encampment round the office. One by one these representatives would enter, quote prices and retire. When a decision was arrived at orders would be distributed amongst the crowd, and the monthly purchases concluded before breakfast. Not much time was wasted in those days!

Underground Cooling Plant.

In his report dated 7th May last the manager of the St. John del Rey Mining Company, of Brazil, devotes considerable attention to the cooling plant, which came into operation towards the end of the financial year. Having referred to the urgent need for lowering the temperature in the deepest workings, also to the delays and the greatly increased expense occasioned by the War, the writer proceeded:—"Heavy as the outlay has been for providing additional power for driving the cooling plant, and the large figure representing that for the cooling plant itself, there is the satisfaction in being able to report that the result of its working is now entirely satisfactory. Naturally at the commencement there were some minor alterations to be made, but the test at the moment of writing shows the efficiency to be within 2 per cent. of the contracted figure, and the change in the mine atmosphere from one of great heat and dampness to a comparatively cool and dry one has had a marvellous effect. Less than a week after the date of starting the plant, applications for work underground increased, whereas previously men applying for work invariably wished employment on surface." The cooling plant started regular working on 3rd December last and the underground Tandem Fan at "14" District two days later. A table comparing the last observations made before the cooling plant and underground fan started up, with the most recent observations, shows that the average fall in rock temperature during this short period has been 0·8 deg. F., and in air temperature 5·3 deg. F.

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ENGINEERING SECTION.

Advantages of Regenerative Working in S.A.R. Electrification.

In the following passage from their report on S.A.R. electrification, Messrs. Merz and McLellan explain the characteristics and advantages of regenerative working as applied to the S.A.R. They write:—

We have already referred to the question of regeneration in dealing with the choice of electrical system for traction. It is necessary, however, to explain its importance in the special conditions prevailing in South Africa.

On some of the sections considered in this report the gradients are very severe, and it so happens that the loaded trains travel from the higher inland levels down toward the coast, returning trains consisting principally of empty wagons. This applies to the main lines in Divisions 1, 6 and 8. This special feature of the traffic is peculiarly well suited to regenerative working. Regeneration enables a considerable part of the potential energy of the loaded trains to be converted into useful work in the form of electrical energy, which is utilised in driving the returning trains up the gradients. Thus the energy in the descending trains which would otherwise be wasted in the brakes as at present is turned to useful account. In this way not only is the cost of haulage materially reduced, but

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the life of the brake-blocks on locomotives and wagons considerably prolonged. On those sections where it would pay to use regeneration it has been taken into account in calculating the cost of electric power. Statistics as to brake-block wear have been prepared for us by the Chief Mechanical Engineer, but we have been unable to arrive at any definite figure representing the cost in brake-block renewals that would be saved by the adoption of electric locomotives working regeneratively. There is no doubt, however, that the saving would be very substantial, especially in Division 6. On the Giovi line, in the North of Italy, the life of brake blocks is more than trebled by the adoption of regenerative working. This is a section of the Italian State Railways on which the bulk of the loaded traffic travels uphill, the trains going down consisting principally of empty wagons. In South Africa, where the conditions are reversed, a still greater improvement should be realised.

Higher Speed Possible.

Another important result of the use of regeneration is the possibility of higher speed on falling gradients. The characteristics of regenerative action and of air brakes are exactly opposite. As is well known, the coefficient of friction between the block and the tyre decreases rapidly as the speed rises; with regenerating motors, on the contrary, any increase in speed gives rise to an immediate increase in the retarding force exerted by them. In other words, the action of the brake-block is essentially unstable, whereas that of regeneration is stable. The two methods of controlling the speed differ in other respects also. With a prolonged application of the air brakes the vacuum is gradually reduced by leakage, and, unless a suitable opportunity occurs for releasing the brakes, the vacuum cannot be recreated without danger of allowing the train to get out of control. Again, the heat developed by the friction will cause serious trouble due to expansion of the tyres if the speed down a long gradient is allowed to rise above a very moderate value. Regenerative working is entirely free from both these troubles, the action being quite independent of the time of application.

It is clear, therefore, that the conditions of operation with electric locomotives enable trains to be run at higher speeds down long gradients than is possible with steam working. In practice, the limit of speed is determined by the ability of the air brakes to bring the train to a standstill at an opposing signal; but as this does not involve any prolonged application, it is clear from the foregoing that the permissible speed is considerably higher than could be allowed at present with steam working. We have taken advantage of this property of regenerative working in calculating the revised timings of trains following upon electrification.

Witbank to Komatipoort.

In Division 7 (Witbank to Komatipoort), where the line is relatively flat, we find from careful examination that the value of the energy regenerated would not be sufficient to justify the extra cost that would be incurred in the equipment of the locomotives. For this Division, therefore, all locomotives would be of the simplest kind without any provision for regenerative working.

SAVING WORN MACHINERY BY NICKEL.

The high cost of iron and steel has stimulated engineers to develop efficient means of restoring parts which have become so worn that they are fit only for the scrap heap. A typical example is an engine crank shaft, which after a certain degree of wear gets out of line to such an extent that it is useless. Welding has been largely used in the work of restoration, fresh iron or steel being welded on to the worn parts, and the whole then made true in a lathe. There are objections to this process in certain cases, and in order to overcome these objections a British engineer has developed a method of depositing nickel on the worn parts. The piece of machinery to be treated is first made free from grease and dipped bodily into a bath of molten wax. After the wax has cooled it is removed from the parts which have to be restored and is left on the others as a protective covering. Cleaning in a bath of acid is followed by immersion in an electro-plating bath which deposits nickel on the exposed surfaces. The coating of nickel is extremely hard, and when the process is properly carried out the nickel adheres with remarkable tenacity to the metal on which it has been deposited. Crank shafts, spindles, axles, pistons and similar objects can be made quite serviceable again by the nickel layer at a cost below that of replacing the whole part. Deposits up to one-eighth of an inch can be applied successfully. It is expected that this process will be developed alongside the welding processes which British engineers have brought to so high a pitch of usefulness in many repairs, such as the mending of cracked or broken castings, which could not be handled by the deposition of nickel.

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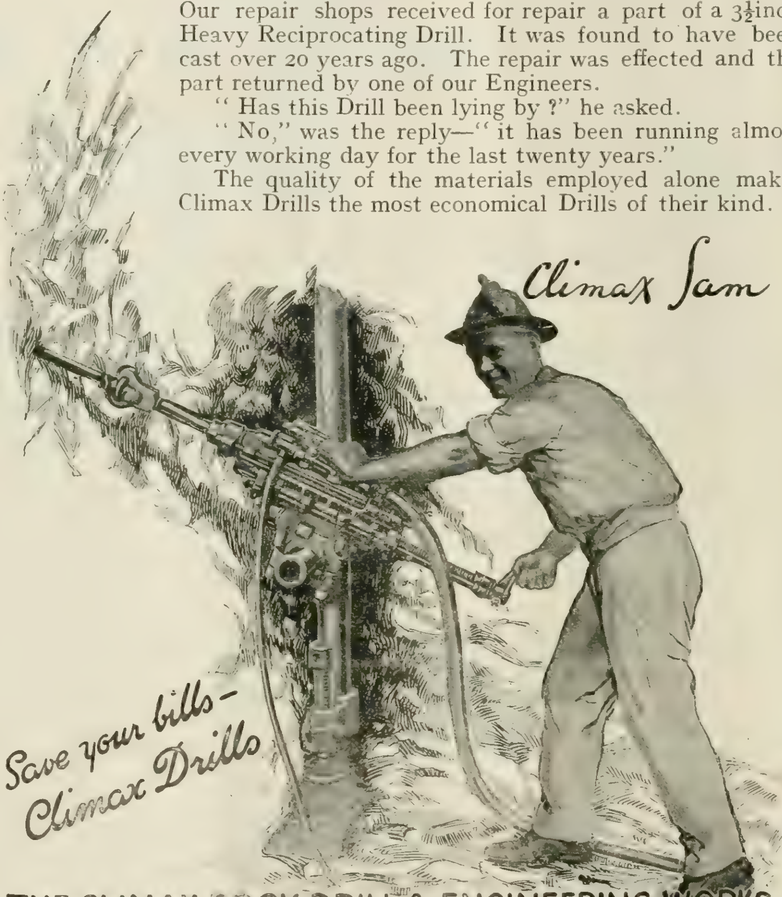

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Letters to the Editor.

OUR ESSAY COMPETITION.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—I have read with interest and disappointment the winning essay on "How to Reduce Working Costs and Improve Efficiency in and on the Mines of the Witwatersrand."

Many of your readers will, no doubt, agree with me when I state that as a result of this competition, ideas for originality, so far as the Reef is concerned, must indeed be very scarce. Of course, it may have been that the prize offered appeared to many to be altogether too small in proportion to the knowledge possibly gained.

In the essay referred to there was so very little mentioned which was applicable to the surface costs of a mine.

Mr. Moore says in paragraph A3 — "Overlapping authority and petty foremen must be got rid of," while in paragraph B9 he states—"Another change that would make a difference on the right side is to give the shift boss his old control over his men." Surely these two suggestions are not in line?

Then again, the suggestion for the reduction of underground costs; an underground efficiency bonus scheme is surely common to most of us on the mines, as it is an established fact on more than one property. Nevertheless, it is a pity your successful competitor did not give some figures in support of this, as it undoubtedly makes for great economy.

Now, Sir, what is wanted is an Efficiency Bonus Scheme for surface employees Can any reader suggest one?

In closing, perhaps I express the opinions of other readers when I state it seems a pity the competition was general. By this I mean that it appertained as much to the surface as to underground.

Would it not have been better had it been split up, say, for underground and surface costs, or again, mining, shops, milling and cyaniding costs? It does not seem feasible, in fact cannot be expected, that ideas should come, say, from a mill foreman for the reduction of underground costs or *vice versa*.

By the way, Mr. Editor, I shall be much obliged if Mr Moore will enlighten me, through the medium of your popular journal, what mines are running to-day with surface costs at four shillings " per ton.—I am, yours faithfully,

A. C. E.

[We are bound to agree with our correspondent that our essay competition did not result in the discovery of any remarkable talent on the Reef. However, Mr. Moore's contribution was adjudged to be the best essay submitted, and accordingly the prize has been awarded to him. The adjudicators considered that Mr. Moore's essay contained many excellent points. It is perhaps to be regretted that "A. C. E." did not submit an essay.—EDITOR, *S.A. Mining and Engineering Journal.*]

WEST RAND GEOLOGY.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—When the Coronation Syndicate started boring on Luipaardsvlei No. 10 I was in hopes that they were going to locate their hole on the dip of Main Reef series, instead of the extension of the Steyn Estate fracture, or of the Western Rand Estate fracture, coming east.

Now that they have located the West Reef to their satisfaction, with an extremely rich foot, it is only a matter of £ s. d. for them, apart from the Randfontein Leader, to bore for the Botha Reef and its leader, and the Battery Reef also, to make up the sequence of the series as on Randfontein, etc., for two-thirds of the farm is covered with it, *vide* the dolomites, as on the Far East Rand, their pointer and your pointer.

It is passing strange, in spite of the fact that Main Reef series is fully exposed in the north-west corner of the farm and the main road to the homestead passes over it, none of our doctors of geology have "observed" it, as they term it. I "observed" it on foot many years ago, when Messrs. Sackie and Sanger held the farm under option, and they can bear witness to my constantly worrying them to put down a drill-hole on the dip, as the reefs are not normal at surface on account of the formation lying almost flat—in fact, the attenuated fringe thereof, to use an expression of Dr. Hatch's on the Heidelberg district at one time. However, the pebbles of each reef can be distinctly traced, even to the "Coronation Reef," the very one the present syndicate is named after, although it may seem a long hark from Heidelberg to there; but never mind, this is a wonderful country, and there are hundreds of miles of any reef outside the "ringed fence," as you say, Sir, in your last issue.

Maybe no one would touch this particular portion of the north-west corner of the farm to which I allude, because it is lying at right angles to the trend of the Randfontein fracture. . That's a little unfortunate, it is true, for those not up in Rand stratigraphy, but a mere detail to anyone who has studied the different geological ages as I have done. In fact, it is one of the special pointers reserved to myself for the final overthrow of mine enemies, "the Witpoortje break geologists"; but as I have friends in the present enterprising syndicate, and wish them well, I strongly advise them to give that north-west corner their serious attention, regardless of the geological or theoretical part of the business.

Main Reef series is there, stark naked. Nature put it there, and I am prepared to stand godfather, as the child looks remarkably promising and the very image of its ma, the "Central Rand."—I am, etc.,

SCOTT ALEXANDER,
"Rand Stratigraphist."

Johannesburg,
August 2, 1921.

THE KNIGHTS DEEP PLANT.

Mr. Christopherson Explains.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—In the issue of the *S.A. Mining and Engineering Journal* of July 30th an article is printed under the heading "The Knights Deep Plant." The article in question contained several definite statements which are inaccurate and criticisms which, with your permission, I propose to show are at the least based on wrong assumptions. I will, therefore, reply categorically to each of the paragraphs contained in the article.

How Seccnd-hand Material has Improved in Value.

It is true that towards the end of 1920 and early in this year the conditions were such that it was possible to realise certain classes of equipment purchased in pre-war days at an approximation to their first cost, notwithstanding the use to which they had been put in the meantime; (this first cost, however, as will be pointed out later, must not be taken as the full installed cost) but these conditions did not by any means apply to every class of equipment. Since then, however, conditions in the second-hand material market have altered, and the prices obtainable have been appreciably less.

What the Knights Deep Plant Cost.

In this paragraph you deal with the total expenditure on plant and equipment as shown in the company's last balance sheet, and after making certain deductions from this total expenditure you arrive at a figure of approximately three-quarters of a million as representing the original first cost to the company of its realisable equipment. But you make no allowance for the fact that these figures include, in addition to the first cost of the individual items of equipment, the cost of their foundations and of the labour and stores consumed in their erection, which, of course, have no realisable value. Nor do you allow for the accumulations of out-of-date machinery and worn-out material which a mine started in 1895 is bound to have.

I think you will find that the cost of foundations and erection, though varying within wide margins in individual cases, can, in the case of the average mining company's equipment, be taken at 25 per cent. over all, and that that is a conservative estimate.

If you had made that allowance, as well as allowing for the cost of shaft sinking, which you rightly regard as dead money, but *excluding any deduction in respect of material destroyed by fire*, you might have arrived at a figure of £600,000. Further, it must be remembered that the Knights Deep plant was not in the main a modern plant, and therefore the proportion of readily saleable equipment was less than would have been the case with a more recently purchased installation.

—And What it Realised.

In this paragraph you indicate to your readers that the plant and equipment has realised something in the neighbourhood of £66,000. There is no other figure mentioned, and not the slightest allusion to the possibility of this amount being considerably under the mark.

The records of the sales notes issued to date, together with the amount received under the fire insurance policy and the sale to the Knights Deep Machinery Syndicate, indicate that the total amount which will be realised for plant and equipment will reach a figure of approximately £420,000.

The Operations of the Machinery Syndicate.

It is admittedly quite possible that the Machinery Syndicate may make a large profit out of the deal. This possibility was fully realised at the time when the sale was effected, *i.e.*, in March. At that time, those who were responsible for the realisation of the Knights Deep assets had to take into consideration that the prices of second-hand material had already fallen, and that there was a distinct possibility that they would continue to fall. This possibility was emphasized by the fact that one or two mines were then making heavy losses. As an instance, in January the E.R.P.M. made a loss of £24,000 and in February of £7,000, and as you are aware, the danger of this mine having to close down operations at an early date was very much publicly discussed. Had it done so, the whole of its huge equipment might have come on the market. Fortunately for everyone concerned, including the members of the Machinery Syndicate, this has not happened, and since March no mine has had to cease operations, but none the less, second-hand material prices have fallen since then. Had such a disaster as the closing of the E.R.P.M. occurred, the fall in prices must have been very much more emphasized.

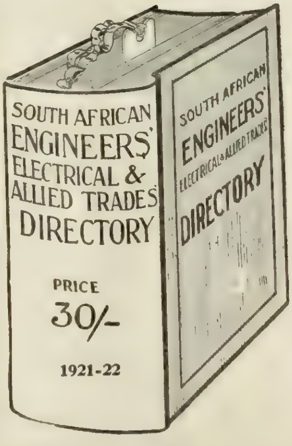
As to whether or no a better price could have been realised for what was sold to the Syndicate if tenders had been called for or if it had been sold by public auction is admittedly a question on which different opinions can be held. Personally, I doubt it, more especially in view of the fact that at that time money was exceedingly tight and the banks were disinclined to be accommodating even for what appeared to be really sound business. Be that as it may, the liquidators of this company decided, for reasons already given, that, provided the figure and conditions they asked for were accepted by the Syndicate by a certain date, they would sell to the Syndicate sooner than take the risk of falling prices. This decision was most carefully considered and discussed with certain shareholders of Knights Deep not in any way connected with any Mining House. It was felt that although the price which was finally decided on gave the opportunity of a large profit to the buyers, yet the sale immediately relieved the company of all risk of having itself to compete in a possibly flooded market, and enabled it immediately to reduce its expenditure at the mine to a low figure, and it was, therefore, agreed that the sale was, under all the circumstances, in the best interests of the shareholders.

So far as the Knights Deep shareholders are concerned, they were informed at the shareholders' meeting held in February that the liquidation value of the shares was estimated to be about 14s., and as that figure is not expected to be exceeded materially beyond 2s. a share, no further announcement has been necessary.—Yours, faithfully,

D. CHRISTOPHERSON.

[We are grateful to Mr. Christopherson for this clear and explicit statement of the affairs of the Knights Deep. We called on Mr. Christopherson before publication of the article, but were not then favoured with the very full information contained in the above letter, which we are sure will be read by many readers with the greatest interest. We would point out that we explicitly stated in our article that the company had realised £66,400 in the way of stores, plant and equipment *up to February 10th*, and no other figure was given us by the Chairman when we called upon him.—

EDITOR, *S.A. Mining and Engineering Journal.*]



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Mashonaland Railway.

Mr. Maguire, presiding subsequently at the general meeting of the Mashonaland Railway Co., Ltd., in moving the adoption of the report and accounts, said that as regarded the Beira-Salisbury section the tonnage of general merchandise increased by 13,743 tons, the revenue being £80,772 more. As a result of the expansion of traffic, and also of the higher rates and fares on this section, the gross revenue had increased from £361,231 in 1919 to £538,285 in 1920; the working expenses, however, had increased by £110,999. The net earnings amounted to £147,541, or an increase of £66,025. As to the section of the line from Kalomo to Broken Hill the net earnings amounted to £217,611, being an increase of £18,960, and the approximate figures for the first six months of the present financial year showed that the position was being satisfactorily maintained. The net receipts from the various sections of their line was £316,441 and after paying certain small sundry expenses there was a balance available on net revenue account of £309,108, to which had to be added the amount of rent charge received from the Beira Co. of £42,500.

The Week in the Sharemarket.

IMPROVEMENT ON PROSPECTS OF WAGE AGREEMENT—SOME PROFIT-TAKING—CITY DEEPS HIGHER.

With the increased prospects of agreement between the Chamber of Mines and the unions, the prices recovered most of what they had dropped the preceding week. On Thursday, however, there was some profit-taking accompanied by an all-round marking down in prices, except in the case of one or two specialities. City Deeps, Crown Mines, and Main Reefs were all better. It seems that London, where the effects of the coal stoppage are still being felt, has been nervous regarding the possibility of a miners' strike on the Rand. Until some reassuring news is sent South African shares are bound to be neglected, and the prospects of interesting more capital in this country must be seriously affected. It is noteworthy that General Smuts seems to have been content to raise £2,000,000 in short-dated Union Treasury Bills and to postpone the issue of the expected loan of £10,000,000. Doubtless the latter will be announced as soon as the monetary out'ook improves. The gold premium remains firm at about 115s. per oz., according to the latest cables available; and it is not considered likely to relapse for a little while. Meanwhile our low-grade mines are enabled to "carry on" and the mine administrations are given breathing space in which to seek a reduction of working costs in regard to white wages and cost of stores. The latter, apparently, is being effected by the simple expedient of refraining from buying any but the most urgently-needed supplies. In the oil share market, all is quietness, awaiting, doubtless, the doings of the Royal Dutch Shell Company. Tins, despite the slightly better news of the market for the metal, are almost lifeless, and diamonds are in like case. For any improvement in these sections of the market we have, of course, to await amelioration in world-trade conditions generally.

	Frid. 29th.	Sat. 30th.	Tues. 2nd.	Wed 3rd.	Thur. 4th.
Anglo-Amer. Corporation	20 0*	20 0*	21 6	22 0	21 6*
Apex Mines	6 9*	7 3†	6 9*	6 9*	6 6*
Bantjes Consolidateds	4 9	4 8*	4 9	4 8*	4 9*
Brakpan Mines	50 0*	—	49 6*	—	50 0*
Brick and Potteries	—	4 0*	4 0*	4 0*	4 0*
Bushveld Tins	0 6*	0 6*	0 7*	0 6*	0 6*
City and Suburbans	2 3*	2 0*	2 0*	2 0*	2 0*
City Deeps	—	—	46 6*	47 6*	49 3
Consolidated Diamonds	14 9*	14 9	15 0*	16 6	16 0
Consolidated Investments	—	22 0*	22 0*		22 0*
Consolidated Langlaagtes	11 3*	11 3*	12 0*	12 0*	12 6*
Consolidated Main Reefs	9 6*	9 9	10 0	10 0*	10 3
Coronation Collieries	—	40 0*	—	—	
Coronation Freeholds	0 11*	0 11*	0 11*	0 11*	1 0
Coronation Syndicates	6 6*	7 0	6 9*	7 0*	
Crown Diamonds	—	2 9*	3 0*	3 2	3 0*
Crown Mines	37 0*	37 0*	37 0*	38 6*	—
Crown Mines Debentures	—				40 0*
Daggafontein Mines	3 1	3 1	3 0*	3 0*	3 0*
East Rand Coals	2 4†	—	2 0*	2 0*	2 0*
East Rand Deeps	0 7*	0 7*	0 7*	0 7*	0 6*
East Rand Minings	8 0*	8 0*	—	—	8 0*
East Rand Proprietary	5 0*	5 1*	5 0*	5 3†	5 4*
Frank Smith Diamonds	3 6*	3 8	3 7*	3 8	3 7
Geduld Proprietary	48 3*	49 3*	49 9	50 0*	49 3*
Glencoe Collieries	14 6†	—	14 6†	—	11 6†
Glynn's Lydenburgs	8 0†	—	—	7 0†	[illegible] 9†
Government Areas	77 0*	79 6	79 6	79 6*	79 0*
Jupiters	—	1 9*	1 9*	—	1 6*
Knight Centrals	3 9*	3 10*	—	4 0*	4 0*
Knights Deeps	3 6*		—	—	—
Lace Proprietary	7 3*	7 0*	—	7 0*	6 9
Leeuwpoort Tins	9 9*	10 3†	9 9*	9 9*	10 0
Lydenburg Farms	5 6*	5 6*	5 6*	5 7	5 6*
Modder B.'s	26 9	26 9	27 3	28 6	28 0*
Modder Deeps	41 10½	42 3*	42 6	43 9	43 3*
Modder Easts	11 3*	11 10½	11 10½	12 4½	11 9
Hume Pipes	17 6†	17 6†	17 0†	17 0†	17 0†
Natal Navigation Collieries	—	—	35 0†	—	—
National Banks	—	—	220 0	—	—
New Eland Diamonds	20 0*	20 0*	20 0*	21 3*	21 0*
New Era Consolidated	7 3†	7 6†		7 6*	7 6†

	Frid. 29th.	Sat. 30th.	Tues. 2nd.	Wed. 3rd.	Thur. 4th.
New State Areas	22 6*	22 6*	22 3*	23 6	23 0*
New Geduld Deeps	—		1 4	1 4*	1 4*
New Kleinfonteins	5 6*	5 3*	5 6*	6 0*	5 10*
New Modderfonteins	67 9	66 6*	68 0*	69 6	69 0
New Unifieds	4 0†	—	—	—	—
Nigels	4 3*	4 0*	4 3*	4 6*	4 3*
Nourse Mines	7 6†	7 6†	—	7 6†	7 0*
Pretoria Cements	48 3*	48 6	48 0*	48 0*	—
Princess Estates	—	1 0*	0 11*	—	0 11*
Rand Collieries		1 0*	1 0†	1 0†	1 0†
Rouxvilles	1 6*	1 6*	1 6*	1 6*	1 6*
Randfontein Centrals	—	10 6*	10 6*	11 0†	10 9*
Randfontein Estates	16 0	16 3*	16 3*	17 9	17 3
Roberts Victors	9 0†	—	9 0†	—	8 6†
Roodebergs	4 0*	4 3*	4 1*	4 1*	4 0*
South African Lands	4 1*	—	4 2	4 2*	4 2*
Springs Mines	36 9b	36 9	37 6*	38 0*	38 3
Sub-Nigels	10 9	11 1*	10 6*	11 6	11 3*
Swaziland Tins	10 0†	10 0†	10 0†	—	10 0†
S.A. Townships	10 6*	10 6*	10 6*	11 0	12 0*
S.A. Alkali	17 0*	17 0	16 9*	16 6	16 3*
South Van Ryns		2 0*	—	—	—
Transvaal Silvers	25 9*	25 9*	25 6	25 9	24 9
Transvaal Lands	—	—	—	16 9*	—
Union 5 per cent.	£98½*	£98½*	£98½	£98¾	£98⅝
Van Ryn Deeps	66 6*	66 6*	67 6*	68 0*	68 0
Village Deeps	6 9*				—
West Rand Consolidated		2 6†	2 6†	2 6†	2 6
Western Rand Estates	3 9*	3 9*	3 9*	3 10*	4 0*
Witbank Collieries	—	44 0		44 0	44 0*
Witwatersrands	10 6†	—		—	—
Witwatersrand Deeps	8 0*	7 6*		6 9*	—
Wolhuters	4 0†		4 0*	3 9	3 9*
Zaaiplaats Tins	3 4*	3 4*	3 3*	3 6	3 4*
West Springs	11 0*	11 0*	12 0	12 6	12 4

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Goldfields Rhodesian Development.

The Gold Fields Rhodesian Development Co., Ltd., report the following June returns:

Falcon Mines, Limited.—Plant crushed, 15,572 tons; blister copper produced, 268.713 tons; gold produced, 3,581 oz.; silver produced, 5,928 oz.; estimated value of output, £31,395. In addition to above, an amount of £1,132 was recovered from customs ore treated at the mine during the month of June. In the above output copper has been valued at £60 per ton.

Gaika Gold Mining Co., Ltd.—Plant crushed, 3,717 tons; total value of yield, £5,397.

Shamva Mines, Limited.—Plant crushed, 56,300 tons; total value of yield, £34,026.

Slate-Arcturus Mines.—Plant crushed, 5,700 tons; total value of yield, £10,348. In addition to above, concentrates on hand valued at £393.

Crescens (Matabele) Mines and Land Co., Ltd. (Veracity Mine Tribute).—Plant crushed, 600 tons; total value of yield, £735.

Exploring Land and Minerals Co., Ltd. (Moss Mine Tribute).—Plant crushed, 810 tons; total value of yield, £1,704. Revie Mine Tribute.—Plant crushed, 600 tons; total value of yield, £627. Blair Atholl Mine Tribute.—Plant crushed, 687 tons; total value of yield, £274.

Gold Fields Rhodesian Development Co., Ltd. (Owl Mine Tribute).—Plant crushed, 754 tons; total value of yield, £1,110.

Sabakwe and District Mines, Ltd. (Sid Mine Tribute).—Plant crushed, 300 tons; total value of yield, £228.

In the above the price of gold is taken at £4.24 per fine ounce, and the total value of the outputs produced by The Gold Fields Rhodesian Development Co., Ltd., and its subsidiaries during the month of June amounts to £87,369.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

STRIKE BALLOT ABSORBING ATTENTION: GOOD RESULTS ANTICIPATED—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—UNION'S IMPORTS AND EXPORTS—FINANCIAL.

General Position.

The week has been one of suspense in regard to the mining *impasse*. Writing before a decision has been arrived at, one can only say that commercial circles are unanimously of the opinion that no strike will eventuate; they think that the common sense of the workers will, at any rate on this occasion, assert itself and prevent a dislocation of business here, which could only be most disastrous to the Union. A first-class workman in the course of a chat said he was absolutely against a strike; that the proposed wages were all right and in consonance with the living costs; and that he, with very many others, thought that, in view of the serious position of the gold mining industry, a reduction in wages should be frankly accepted by the workers. One can only call attention to the Chamber of Mines' statements which have appeared in the Press during the past few days, which have gone so statistically into the matters in dispute. The result of the present ballot is, of course, in the lap of the gods, but, notwithstanding many apparently well-founded statements that the vote of the miners will be in favour of a strike, there is a spirit of compromise in the air, and it is thought not at all unlikely that a timely concession by the Chamber of Mines may eventually satisfactorily close the present state of discord. We have previously stated, and affirm again, that a reduction in miners' wages is absolutely imperative, but if any reasonable action on the part of the Chamber of Mines can avert the threatened strike it will be welcomed on all sides. In iron and steel, there have been no radical alterations in prices, but the tendency is still towards lower levels. Timber remains weak and sagging, with a probable weakening in the near future. The opinion of merchants is that we have not yet touched the lowest levels. The continued rise in the price of gold is a big factor in conditions locally, and is being followed with the greatest interest. Importers think, and apparently with good reason, that about September-October the pendulum regarding the price of gold will be moving against us. During the past week things have ruled very quietly on the Commercial Exchange, but forced realisation of stocks has continued, and in the opinion of an influential importer is likely to last for some time, until prices are at a level justifying further importations. Linseed oil has advanced again by about 10 per cent. at Home, white lead in sympathy rising correspondingly.

Iron and Steel.

Transactions put through this week have been of a very limited nature; prices (nominal) remain much about the same, but firm orders can secure reductions on rates quoted.

Latest quotations:—Dunswart, 29s.; Union Steel Corp., Ltd., ordinary sized rounds, flats and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 49s. 6d.; ⅜ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron and steel, 42s.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 49s. 6d. to 62s.; ¼ in. square iron, 55s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 59s. to 62s. 6d.; channels and joists, 47s. to 48s.; imported angles, 45s. to 47s.; ⅝ in., 10¾d.; ¾ in., 10¼d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d. to 8¾d.; larger sizes, 7½d. to 8d.; spring steel flats, 8½d. to 9d. per lb.; mild steel plates, 1-16 in., 40s. to 41s.; 3-16 in., 39s. to 40s.; 5-16 in., 35s. to 36s.; ½ in., ⅜ in., ⅝ in., ⅞ in., and 1 in., 35s. to 42s. 6d.; bolts and nuts, ⅜ in., 1s. 2½d. to 1s. 4d. per lb.; ½ in., 77s. 6d. per 100 lbs.; ⅝ in., 66s.; ¾ in., 64s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in., ¼ in., ½ in., 9½d. per lb.; ⅝ in., 72s. 6d.; ¾ in., 68s. 6d. per 100 lbs.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 57s. 6d.; ⅝ in., 55s. per 100 lbs.; per lb.; ⅜ in., 10d.; ½ in., 64s.; ⅝ in., 60s. 6d. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 10d.; ½ in., 1s. 8d.; ⅝ in. and upwards, 1s. 6d. to 1s. 9d. per lb.; copper tubes, 2s. 3d. to 2s. 11d. per lb.; ¼ in., 3s. 9d. per lb.; brass sheets, 2s. 3d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 3d. to 2s. 5d. per lb.; fire box copper, 3s. per lb.; copper rods, 2s. 2d. to 2s. 6d. per lb.; copper tubes, 2s. 6d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7½d.; hollow, 1s. 0½d.; wire nails, 42s. to 57s.; shovels, 60s. to 65s.; wheelbarrows, 57s. 6d. to 60s.; picks, 45s. to 75s.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d. per 98 lb. coils; 24s. to 25s. per 68 lb. coils, large, 12 gauge, 28s. 6d. per 96 lb. coil; 14 gauge, 22s. 6d. per 66 lb. coil; plain wire, No. 8 galvanised, 35s., and black 32s. 6d. per 100 lb. coil.; fencing standards, 12, 14, and 16 lb., at 27s. 6d., 30s. and 32s. 6d. respectively per dozen; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb.; steel plates, about £21 to £23 a ton. Cast steel is £47 10s. to £50 per ton; mild steel, £19 per ton.

Second-hand Iron and Timber Yards.

Business this week is reported as slack; no great improvement is expected before a decrease in wages has been effected. A dealer said that even a decline of 3d. an hour in respect of the building of a five-roomed house would mean a saving of about £100 in labour alone. Timber is ruling at 10d. to 1s.; iron at 5d. to 6d. Stocks are plentiful.

There is at present a somewhat big demand for piping of the larger sizes, of from 9 to 12 inch, at prices ranging from 10s. 6d. to 16s., showing an advance of about 20 per cent. during the past three to four months. Steel plates have come down very considerably to about £21 to £23 per ton for new plates, which about five years ago were fetching about £90 a ton. Continental steel plates are cheaper, but are not in demand. Rails are very cheap; Germany is delivering rails into the country new, at about £16 per ton, which some four years ago commanded £30 a ton. Boilers are still scarce, loco. types and portables particularly so, which find a ready sale.

Engineering Shops.

Things are much about the same as they were; factories are marking time pending the result of the threatened strike. A prominent engineer says that an engine-driver told him that he himself, the secretary, and one other member in a caucus were against the strike, but were in a minority of about 50 to 1. In the opinion of my informant and in that of most commercial men, though much to be regretted, perhaps on the whole the best thing in the interests of all concerned would be to clinch matters once and for all and to place mining conditions on a more economic basis. The engineer giving this information likened the present position to a lunatic or drunkard driving his head against a wall. Until the superior hardness of the brick wall had been well established no good results could well be expected, but once the fact had been established no further cussedness would be experienced. The miners were fighting now not the Chamber of Mines, but general economic conditions. It was generally conceded that the Chamber recognises the serious position of the situation, and is making every effort to bring public opinion into line with the real issues of the case and so avoid a crisis. The engine-driver aforementioned remarked he considered it his duty to accept £1 a shift rather than see development hung up, and would do all he could to persuade his comrades to accept such terms in preference to kicking against the pricks.

Timber and Building Materials.

Business remains very quiet. Quotations: 3 x 9 deals 1s. 1d. to 1s. 2d.; scantlings, 1s.; beaver board, 5d.; oregon, 8s. to 9s.; pitch pine, 9s. to 9s. 6d.; floorings, 7d. to 7¼d.; ceilings, 5d. to 5½d.; corrugated iron, 24 gauge, 9½d. to 11d. Furniture timber: Burmah teak, 18s. 6d. delivered; American oak, 1 in. to 3 in., 1s. 6d. per super; American black walnut, 1 in. to 4 in., 1s. 6d. per super; West African mahogany, 27s. per cube at coast; Japanese oak, 15s. 6d. per cube. Bricks are 70s. for blue stock, 60s. for mixed, £4 10s. to £5 for wire cuts, and £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 7s. 6d.; blue building lime, 3s. 9d.; plaster lime, 4s. 9d. per bag; cement, 11s. 6d. per bag; damp course and roofing, 1-ply, 37s. 6d.; 2-ply, 46s.; 3-ply, 55s.

A prominent timber merchant said things are very flat, attributable to the threatened miners' strike and to the present dispute between the builders and the union. Stocks on hand are good; there is no news from the Baltic as to the future trend of things.

The building workers' ballot in respect of the proposed 15 per cent. reduction in wages is now proceeding; the result will not be known until next week. Both employers and employees appear to be adamant in the position taken up by them, and the outcome is awaited with no little anxiety.

Electrical Goods.

Prices, though remaining at the moment without quotable change, still show a downward tendency. The drop in lamps previously reported has been from 21s. to 18s. wholesale and 27s. to 21s. retail, Osram lamps remaining at 27s. Goods are arriving regularly both from Britain and the Continent, those from the latter showing a marked superiority over English as regards cost. The reason is explainable by reason of the very much cheaper foreign labour, which more than accounts for the dearer cost of raw materials. At the moment Britain is hopelessly out of it as regards labour, and though the raw material question is more or less in the hands of the Allies, the cost of the latter has, so far at any rate, not counterbalanced the excessive cost of labour. Will the British workman eventually see that it is only by renewed effort, longer effort, and lower demands that he can hope to cope with the present universal bread struggle? A prominent dealer said that as regards porcelain wares Germany must perforce continue to dominate the market and to beat both Britain and America; the raw material is in that country, and with cheaper labour combined we cannot hope to compete with her in those products.

Empire's Timber Resources.

It is understood that a Royal Charter will shortly be given to carry on propaganda with a view to conserving and improving the Empire's timber resources.

Union's Imports and Exports.

As showing the extent of the fall in trade experienced in South Africa in recent months, it is only necessary to state that while in May last year the Union's imports were valued at £7,596,000, those for the corresponding month this year were only £3,649,000. The same compariosn applied to exports shows £6,562,000 and £4,184,000 respectively. The first five months of 1921 showed our imports valued at £24,600,000, a falling off of over £7,000,000 in comparison with the corresponding period of last year. Per contra exports for the five months totalled £22,000,000, showing a drop of about £20,500,000. The Union shows, therefore, comparing the first five months of the current year with last, a decrease of over £27,000,000. Many factors helped towards diminution in imports during that period, but it is satisfactory to record that machinery showed an increase of nearly one and a quarter millions. Another healthy sign is that farming implements also showed an increase. The big drop in exports is attributable to the falling off of diamonds £6,000,000, £3,000,000 in hides and skins, about £1,500,000 in gold, and £10,600,000 in wool during the period under review.

Trade of the Union: Imports and Exports for July.

The following is a statement of the value of Customs imports, exports and revenue collections for July:—

	Imports.	Exports.	Duty.
Capetown	£620,688	*£4,022,843	£83,360
Port Elizabeth	644,005	373,952	66,676
East London...	169,181	326,974	20,882
Durban	1,518,112	650,274	105,127
Johannesburg	—	—	57,775
Lourenco Marques	305,446	—	14,811
G.P.O.	—	—	18,453
Other ports and stations	27,616	28,800	13,968
Totals	£3,285,048	£5,411,843	£380,972

*Includes £3,683,250 gold exported at Capetown.

Sir Leo Chiozza Money, the member for Mid-Northampton, and undoubtedly with a big career in British politics, has given utterance lately to big things in connection with English trade revival. He thinks that Britain, though no longer the workshop of the world, is one of many, and with her ports and means to work effectively is one of the main factors in the world's commerce. The recovery from the huge dislocation caused by the recent world's holocaust and the coal strike, etc., may be slow, but with energy and foresight may occur. America's position as a creditor nation, with something like £4,000,000,000 owing to her, is rather terriffic as a commercial concern, but notwithstanding her unconcern in regard to imports, which is steadily growing greater, there is no need to be greatly concerned, as she can convert such commitments by new investments, which she is not only anxious to do, but steadily doing.

Financial.

The Treasury announces that the new Government 6 per cent. loan has met with fair success. To date amounts subscribed are £750,000. Treasury bills have been converted up to £302,000, and there has been converted from the 1921-36 5 per cent. stock £4,691,000.

Sir Robert Horne (Chancellor of the Exchequer), in regard to British financial transactions, pointed out in the House of Commons that the foreign press were laudatory in regard to the manner in which Britain dealt with her financial commitments. He emphasised that signs of recovery in trade were existent, and that duty and thrift were the key-words of everyone.

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WRIGHT'S ROPES

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S.A. Reserve Bank.

At the first general meeting of stockholders held at Pretoria last week Mr. Clegg, Governor, explained the true functions of the Reserve Bank. A central bank, he stated, was the recognised means of mitigating, if not altogether avoiding, those periodic crises which occur through trade booms and prices inflation. If properly managed, a reserve bank should have so husbanded its resources that when other banks are at the end of their tether as regards advances it can come to their help in the way of rediscounting their bills and thereby carrying on the trade of the country pending adjustment of prices. The chairman referred to the poor response on the part of the Union to take up shares, which was due partly to a general scarcity of capital and also to an attractive appeal of a Government loan. However, the full amount of capital had been subscribed by the Treasury taking up the balance unapplied for, and everything is now in full swing. Not the least satisfactory feature of the meeting was the re-election of Sir Evelyn Wallers as a director of the bank, who asserted that the Reserve Bank was bound to occupy a most important place in the Union's financial future. On July 30 the ratio of cash reserves to liabilities to the public was 92.6 per cent.

It is stated in London that £2,000,000 of South African Union Government's six months' Treasury Bills have been placed on the market on a discount basis of 5⅛ per cent. The total value of the outstanding Union's Treasury Bills in the market is stated to be £7,000,000.

Mr. Smart, the chairman of the Standard Bank, at the recent meeting of the shareholders of the Bank, said one of the events of far-reaching importance in connection with South Africa was the passing of the Central Reserve Bank Bill and the consequent establishment of the Central Reserve Bank in the Union. The chairman predicted that conditions all over the world would soon become normal and that South Africa would be the first dominion to go ahead. In connection with our premier banking institution the chairman stated that the total cash holdings as at the end of March were £10,222,000, and investments £5,266,000.

Mr. Ernest Chappell, who has recently returned here from a special mission to Europe, states that although reluctance is generally being shown to a resumption of trade relations with Germany, that natural desire must give place to better conditions if Britain is to reinstate herself as an industrial country. Central Europe has always been a good market for British manufactures and should eventually become a better. Sentiment is false in business transactions, and sooner or later the old relations will have to be restored.

Power Station.

As foreshadowed some weeks ago, there is now available, owing to the installation of additional plant, more current for outside districts. It is hoped that during the current month further increase will be available.

Wage Reductions.

The Potchefstroom Town Council has reduced the wages of white labourers from 7s. 6d. to 6s. per diem.

Wool Market Firm.

London advices on the wool auctions, which closed there on 28th ult., indicate a firm market at prices about the same as those ruling at the close of June series, with an improved demand for Home requirements. The next auctions commence on August 30.

New Shipping Service—Canada to South Africa.

The Canadian Government has, it is announced, inaugurated a new service to South Africa from Vancouver by a sailing steamer now *en route* to Durban.

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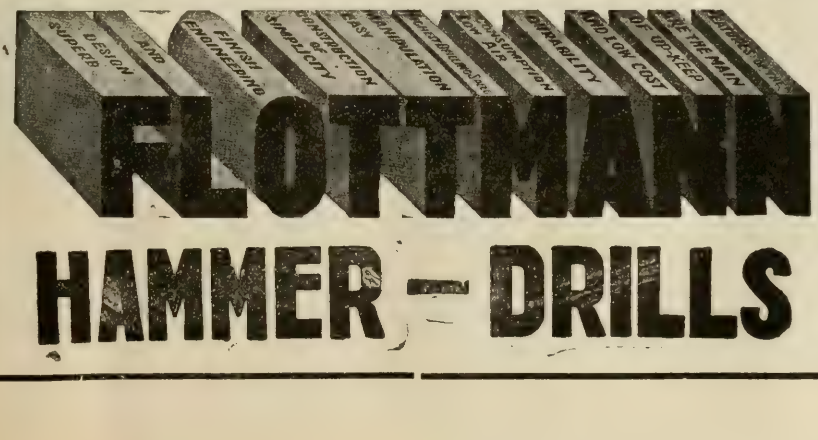

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RHODESIAN SECTION.

Rhodesia Consolidated.

The secretary informs shareholders that in accordance with the resolution to sub-divide the capital into 4s. Ordinary and 6s. Deferred shares the directors have fixed Friday, 1st July, as the date from which such sub-division takes effect. The new certificates will be ready on 11th July. The secretary adds: "Grootfontein borehole—Mail advices from Johannesburg report that this borehole had attained a depth of 2,515 feet on the 23rd May last. The estimated depth at which the main reef series will be intersected is 3,400 feet. Asp mine—A satisfactory tributing agreement has been entered into for the working of this property, and under date 28th May it is reported that the tributors are pushing ahead with the erection of a 10-stamp mill . . . Falcon mine—The management has secured important economies at this mine, and despite the present low price of copper a satisfactory profit is being shown on monthly returns."

* * * *

Shamva Mines.

The Shamva report for 1920 states that systematic development and prospecting operations have continued to disclose a large tonnage of payable ore and of low-grade ore, which is payable under existing conditions. At December 31, 1919, the estimated ore reserves stood at 1,932,000 tons, of an average estimated value of 4.31 dwt. Adding the total tonnage brought in during the year (608,759 tons, of which 319,100 tons was excess ore of an average value of about 2.7 dwt.), and deducting the tonnage crushed (609,509 tons, of an average value of about 3.6 dwt.), the estimated ore reserves at December 31, 1920, were 1,981,250 tons, of an average value of 4.1 dwt. The mill crushed 609,509 tons, producing 96,718 ounces of gold, giving a total net recovery value of £538,887, the profit realised, including sundry revenue, but deducting London expenses, being £223,526. The rise in working costs to 125.18d. per ton, against 114.60d. per ton in 1919, is mainly due to all-round increases of pay, to shorter hours of working, to increased cost of coal, harder rock, extra royalty, and higher railway rates. The additional stamps and reduction works which were in course of erection last year have now been completed, and are giving satisfactory results. The Rhodesian Mine Workers' Association having made certain demands which the management refused to grant, a strike of mine employees took place in February of the current year, which entailed the loss of 32 working days. Work was resumed on March 22, and has since then proceeded under normal conditions. Four quarterly dividends equal to 30 per cent. were paid for the year 1920. In respect of the current year two quarterly dividends, at the rate of 30 per cent. per annum, have been declared for the six months ending June 30, 1921. The increase in working expenses is due mainly to all-round increases of pay, to shorter hours of working, to increased cost of coal, harder rock, extra royalty, and higher railway rates. The seriousness of the position may be gathered from the following figures for the past six years, showing the average working expenses per ton: 1915, 99.8d., 1916, 103.3d., 1917, 109.9d., 1918, 118.1d., 1919, 114.6d., and 1920, 125.18d. The increase of 10½d. per ton last year is accounted for, among other things, by an extra 5d. on Government royalty on premiums and 2d. in fine grinding, due to harder rock. Power costs were also higher, as well as general charges, mainly bank charges. Mining actually showed a reduction of 2d. per ton. Worked out per ounce of gold won, the cost is now £3 5s. 9d., as compared with £2 6s. 5d. in 1915. When it is remembered that the ore reserves have an estimated value of only 4.31 dwt., it will be seen what a large hole in receipts working expenses make. In the report reference is made to the difficulty of sampling a mine like the Shamva from development work. It is interesting to note that while in 1920 609,509 tons were crushed, replacement was effected to the extent of 608,759 tons, 52 per cent. of which, or 319,100 tons, was "excess" ore of an average value of about 2.7 dwt. At the end of last year the estimated ore reserves were 1,981,250 tons, of an average value of 4.1 dwt., in contrast with 1,982,000 tons, of an estimated value of 4.31 pennyweights twelve months earlier. With such low-grade ore, it is obvious that, apart from the gold premium, the profit with the continuance of 30 per cent. dividends could not have been maintained. The fact that the actual extraction was 88.32 per cent., compared with the theoretical extraction of 90.54 per cent., affords proof of the skilful manner in which the mine is worked.

* * * *

Rhodesia Railways.

The ordinary general meeting of the Rhodesia Railways, Ltd., was held at 2, London Wall Buildings, E.C., on June 21. Mr. Rochefort Maguire presided, and in moving the adoption of the report and accounts, said the gross revenue amounted to £1,407,853, being an increase of £349,556 over the previous year, but against that there was an increase in working expenses of £283,991. It was clear that but for the increase in rates and fares the larger transport business during 1920 would have resulted in smaller net earnings than those in 1919, instead of the increase of £65,565 shown in the report. The number of passengers increased by 76,710, of which native traffic accounted for about 48,000. In general goods there was an increase of 125,854 tons, or nearly 41 per cent. As regarded the current year the approximate figures for the first six months as compared with the same period for the previous year, showed an increased gross revenue of £215,194, while the net earnings showed an improvement of £77,844. The traffic continued to increase, but during those six months the percentage of expenditure to gross revenue again rose, and stood at approximately 63 per cent. With regard to the issue of £2,000,000 secured notes up to the present £1,700,000 notes had been sold at a price to yield 94 net to the company.

* * * *

Union Miniere.

According to the *Agence Economiquė et Financiere*, the accounts of the Union Minière to be presented at the annual meeting on July 11 will show a gross profit of 15,740,047f., which compares with 30,236,920f. a year earlier. After paying debenture interest and making various appropriations, a balance of 9,864,386f. is to be applied to amortisation. No dividend will be declared. The absence of a distribution will, of course, affect Tanganyika Concessions. The conditions of the Copper Market are well known, and it is presumably due to the low price of the metal that the past year compares unfavourably with its predecessor.

Read "The Great Mining Future of the Katanga."

The South African
Mining & Engineering Journal
THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.
Established 1891.

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THE S.A. INSTITUTE OF MEDICAL RESEARCH, JOHANNESBURG.

The Institute built by the Mining Industry on ground given by the Union Government is supported jointly by the Government and the Industry, through the W.N.L.A. In addition to housing the Miners' Phthisis Medical Bureau, the Institute, under the able direction of Dr. Watkins-Pitchford, has accomplished a vast amount of work of national importance. During last year no less than 406,000 doses of Sir Spencer Lister's famous and most efficacious anti-pneumonia vaccine were issued to the native labourers on the mines. The natural expansion of the activities of the Institute is now calling for increased accommodation, and in view of its beneficient services in the cause of humanity it is hoped that wealthy and public-spirited citizens may supplement its existing resources by private endowments.

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The Great Mining Future of the Katanga.

BOLD POLICY OF EXPANSION—THREE HUNDRED MILLION FRANCS TO BE RAISED—ANNUAL PRODUCTION OF 100,000 TONS OF COPPER CONTEMPLATED—GOLD, TIN, COAL AND URANIUM PROSPECTS—RAILWAY AND WATER POWER EXTENSION—CHAIRMAN'S PROPHECY OF "ERA OF INTENSE ACTIVITY."

Katanga is on the eve of great developments, described by the President, M. Jadot, at the annual meeting of the Union Minière, the other day, in the following glowing terms:—" We are about to embark on a very large programme. If, as there is no doubt, the public authorities afford us their co-operation in the realisation of that programme, it is certain that the result will be, for Katanga in particular and the colony in general, an era of intense activity. The schemes which we have in view will involve considerable expenditure, but they will place our company among the most important producers of copper in the whole world; further, our other metals—tin, cobalt, uranium—justify legitimate hopes. Moreover, the mining activity in the Katanga Province will require the construction of a system of railways more than 1,500 kilometres in length. Add to these the subsidiary industries which cannot fail to rise around our own (such as colliery, cement works, etc.), and you will agree with us that the realisation of this vast programme will stimulate in our colony a prodigious outburst of activity that will ensure for it a brilliant future." Some extracts from M. Jadot's speech and the report of the Company afford particulars of the contemplated schemes.

From the annual report of the Union Minière and the speech of M. Jadot, the President of the Union Minière, at the annual meeting of the Company, held recently in Brussels, we glean the following particulars of the vast new plans of development in the Katanga:—

History and Assets.

The Union Minière Company was formed in 1906 to operate for the joint benefit of the Katanga Special Committee (virtually a branch of the Belgian Government) and the British Tanganyika Concessions Company, a mineralised area in the Congo Free State, Central Africa, of the immense extent of 60,000 square miles. The discoveries already made therein include a copper belt of about 200 miles in length, containing more than 100 known copper deposits, and a tin belt nearly 110 miles long. There is also the Ruwe gold mine and extensive coal and iron deposits. Furthermore, certain of the copper ores contain a somewhat high percentage of cobalt, which it is hoped shortly to turn to profitable account, while last, but not least, encouraging occurrences of radium have been found, which it is hoped may lead to something not only of considerable commercial benefit to the Company, but also invaluable for the interests of suffering humanity.

Last Year's Profit.

Hitherto, while the other resources have not been neglected, it is to the development and utilisation of the enormous copper deposits of the Katanga belt that the bulk of the technical and financial activities of the group has been directed. But for the war and its unexpected repercussions doubtless even greater progress would have been made. Nevertheless from its richer ore alone the Union Minière Company is already producing nearly 3,000 tons of copper monthly. It speaks volumes for the value of the deposits and the able direction and management that the concern has been, and is able to continue to operate at a profit—albeit, a relatively small one—at a time when the temporary post-war demoralisation of the world's copper trade has forced many producers to shut down and all the other large ones seriously to curtail their outputs.

For 1920 the Union Miniere now announces a net profit of nearly 10,000,000 francs, against 33,000,000 francs for 1919 and an average for the five war-years 1914-18 (after very heavy special appropriations) all but 9,000,000 francs. For 1919 13,000,000 francs were distributed in dividends, against 37½ millions for the period 1914-18. In respect of 1920 the Directors are making no distribution, the whole of the profit already mentioned having been written off to depreciation account.

Mining in the Katanga.

Smelting Rich Ores.

The Union Minière production for the first six months of 1921 has been as follows:—

	Tons.
January	1,321
February	1,490
March	2,432
April	2,205
May	2,846
June	2,736
Total	13,030

River Scene in the Katanga.

This output was obtained by the direct smelting of rich ores (average grade 17 per cent.) extracted from four mines - the Star, Kambove, Likasi and Luushia. From July or August the concentrator will commence to supply a certain quantity of high grade concentrates, so it is hoped to see production still further improved, and for 1921 a much higher output than that of last year is expected.

According to the recently expressed opinion of the most competent authorities, it is calculated that the world's production for 1921 will not exceed one-third of the pre-war output. All the producers have stopped or considerably reduced their production; the Union Minière alone, thanks to the costs of production due to the richness of its ore, has been able to maintain its mines and plant in full activity.

It is very fortunate that this should be so, because if the stoppage of the metallurgical industry in America or Europe constitutes a misfortune of simply local interest, it would be quite different with a stoppage of industry in Katanga. Such a stoppage could not fail to become a veritable catastrophe.

In fact, the Union Minière is the principal—and practically the unique—factor of the activity of Katanga; transport, labour, agriculture, local commerce—all are dependent on the fortunes of the Union Minière.

Mr. Robert Williams, Vice-President of the Union Minière.

Immense Ore Reserves.

In the course of his speech Mr. Jadot said, *inter alia*:—

The prospecting of our mines is being carried on actively in order to complete the investigation of our whole concession. As stated in our report, it has been proved by numerous boreholes that in ten of our deposits there are ores of various grades containing about 2,000,000 tons of copper which amply confirms the estimates which we made in 1911. The discovery of sulphide ores in large quantities is of capital importance for our company. Indeed, it justifies us in the hope that certain of our mines, if not the greater part of them, continue in depth. These sulphide ores will be a valuable element of supply for our metallurgical operations; further, we hope that they will greatly facilitate the manufacture of sulphuric acid, which is indispensable for the running of our electro-chemical process. In addition to drilling we are also carrying out the delimitation of our mining circles. All this work of prospection and delimitation involves a large expenditure, but it is urgently necessary, because it has to provide the foundation on which to erect with full knowledge of the facts, the important plan which we have in view for the treatment of our ores other than those suitable for direct smelting.

Cost of Concentration and Plant.

The execution of our programme of new works on capital account has been energetically continued, and we hope to finish by the end of the year the major part of the work in hand. The amount of capital expenditure in 1920 amounted in round figures to 66,000,000, of which about 54,000,000 was spent on the concentrator and accessories, including extensive railway work and mine development for the supply of the concentrating plant. The expenditure on other work on capital account, particularly in drilling and equipment at the Western mines, at the Sankishia Colliery and at the mines, amounts to about 12,000,000.

An Instructive Comparison.

The figures as the probable amount of expenditure required to carry through the programme for the treatment of our low-grade ores (about 300,000,000 fr. of new cash to be expended over six years) may appear excessive.

It must, however, not be forgotten that this programme of treatment provides for an important output of metal, which may rise progressively to 100,000 tons of copper per year, independently of the production of our present plant. Such an output will place our company among the largest producers of the entire world. This capital is, moreover, nothing very extraordinary. Indeed, the principal American copper-producing companies, whose production, realised or expected, is about equal to that we have in view, have all expended capital varying from 60,000,000 dollars to 150,000,000 dollars. I would mention specially the Chile Copper Company, which controls the important mines of Chiquicamata in Chile, and which has erected there the largest plant in the world for the electro-chemical treatment of ores—a plant resembling in many respects that which we propose to create in Katanga. The productions of this company, which commenced operations in 1915, amounted in 1920 to 50,000 tons and this annual output is to be increased progressively to 125,000 tons. The capital of the company is 95,000,000 dollars in shares and 50,000,000 dollars in Debentures.

M. Jadot, President of the Union Minière.

It is evident, however, that we shall only embark this new capital in the Union Minière gradually, so as to go ahead only with the absolute certainty of achieving success at the termination of our efforts.

It must, indeed, not be lost sight of that such a large production as that I have indicated requires the extraction of enormous quantities of ore. For this purpose we shall have to secure the indispensable machinery and labour, and, further, the railways must be put in a position to cope with a constantly-increasing traffic.

Hydro-Electric Power.

The programme which we have outlined for the electro-chemical treatment of our ores, which are not suitable for concentration or for direct smelting, will necessitate the creation of powerful hydro-electric works.

Railways.—The question of transports, which has always been one of the vital factors of our enterprise, will acquire, by the execution of the programme explained above, a capital importance, not only for the mining industry, but for the whole of Katanga.

Indeed, the execution of this programme is evidently conditional upon—

Firstly, the linking up of the Katanga Railway with the Benguella Railway, which will have to serve our large hydro-electric plant at N'Zilo and our Western mines.

Secondly, the construction of the section of the Bas-Congo Katanga Railway between Bukama and Djoko-Punda, which will connect Katanga with a region rich in labour and food-stuffs. The final surveys of the Chilongo-Ruwe section are in hand, and the construction of the line will be commenced very shortly.

Subsidiary Metals and Coal.

Cobalt.—On various occasions I have informed you, in previous statements, that some of our mines contained ore in which copper was associated with cobalt. Recently we have restarted work at certain of these mines, and we expected to produce regularly a certain tonnage of cobaltic copper. The refining of this metal will be entrusted to the Hoboken Metallurgical Works.

Tin.—The production from our Busanga mines for the first five months of 1921 has been 255 tons (of cassiterite), and this is being steadily increased. The cassiterite produced is also being refined at the Hoboken works.

Uranium.

The more complete investigation of our mines, which was begun in 1920, has enabled us to restart, at the Luiswishi mines, the work which in 1913 resulted in the discovery of thin stringers of uranium ore, with which, as you are aware, radium is always associated. This work has confirmed the existence in this mine of ore which is very rich in uranium and radium, and the importance of this discovery is now being investigated. Further, we have also discovered uranium ore in the mine of Shikolowe, 25 Km. south-west of Kikasi, and we are actively carrying on prospecting work there. Up to now the uranium ore in Katanga has been found in the form of thin stringers and small pockets intercalated in the copper deposits. It assumes various aspects, but is characterised by its high grade. Although we have not yet found a real body, we are nevertheless justified in hoping that our investigations will bring to light important deposits of uranium and radium ore. This discovery would not only have a considerable influence on the prospects of our company, but it would be invaluable for the interests of humanity. Indeed, our hospitals, which to-day find great difficulty in procuring at enormous expense minute quantities of radium, when they have need of it, would find available for them the quantity of this precious metal indispensable for their requirements.

Coal.

The results of the drilling and prospecting work in the coal-bearing basin of Sankishia are very satisfactory, and the working of this deposit will soon be producing a sufficient tonnage to be of considerable assistance to our industry and to the railways.

Rhodesian Mineral Output for June.

Gold	49,465.68 fine ozs.	£238,199
Silver	13,242.50 ,,	1,241
Coal (raised 49,425 tons) ...	(sales)	16,185
Coal used for Coke & Bricks		6,698
Copper (Blister)...	263.94 tons	15,873
Chrome Ore	5,831.06 ,,	22,630
Asbestos	1,992.52 ,,	51,965
Arsenic	48.32 ,,	1,709
Mica	7 tons 954 lbs.	1,869
Total		£356,429

N.B.—The above gold output includes £29,640 premiums on gold.

Rhodesian Asbestos—June Returns.

	Tons.	Value.		
BULAWAYO DISTRICT.				
Biltong (Benjamin Wilson)	8.75	£334	8	6
Birthday A & B (Willoughby's Cons. Co., Ltd.	270.15	9,320	3	6
Leo Asbestos (F. M. Perkins)	2.00	12	0	0
Nil Desperandum & Sphinx (African Asbestos Mining Co., Ltd.) ...	381.25	9,531	5	0
Pangani (J. S. Hancock) May	14.69	354	1	2
Do. (June)	23.89	575	19	1
Serpentine (A. Asbestos Mining Co., Ltd.)	9.80	245	0	0
Shabanie (R. and General Asbestos Corp., Ltd.)	698.64	17,246	2	6
Slip (Slip Syndicate)	30.00	1,500	0	0
VICTORIA DISTRICT.				
Balmain (African Asbestos Mining Co., Ltd.)	103.00	2,575	0	0
Gath's (R. and General Asbestos Corp., Ltd.)	317.00	7,925	0	0
King Asbestos (Rhod.) Ltd.	133.35	2,345	10	0
	1,992.52	£51,964	9	9

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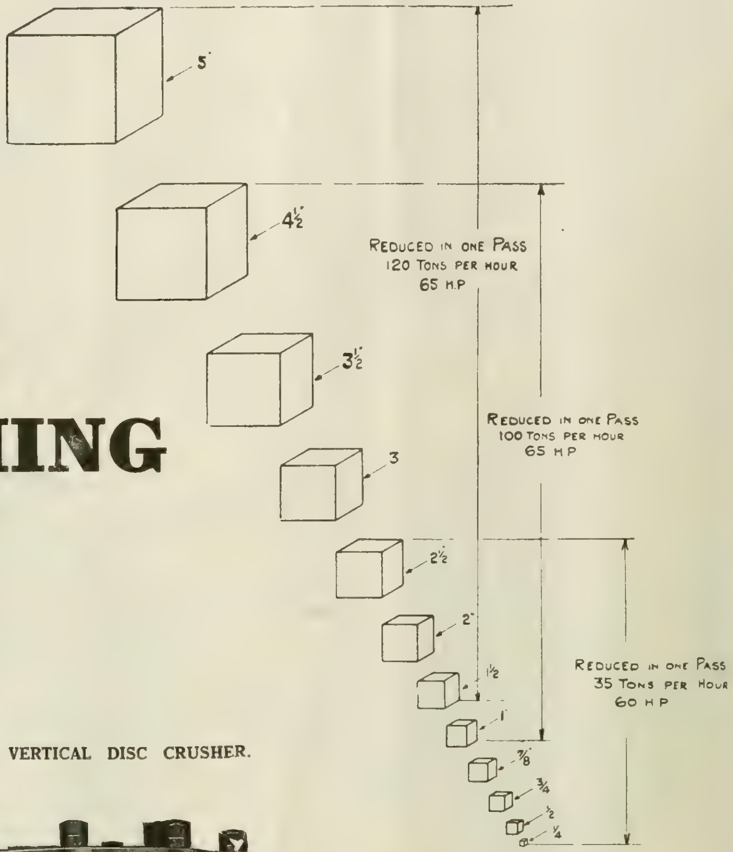

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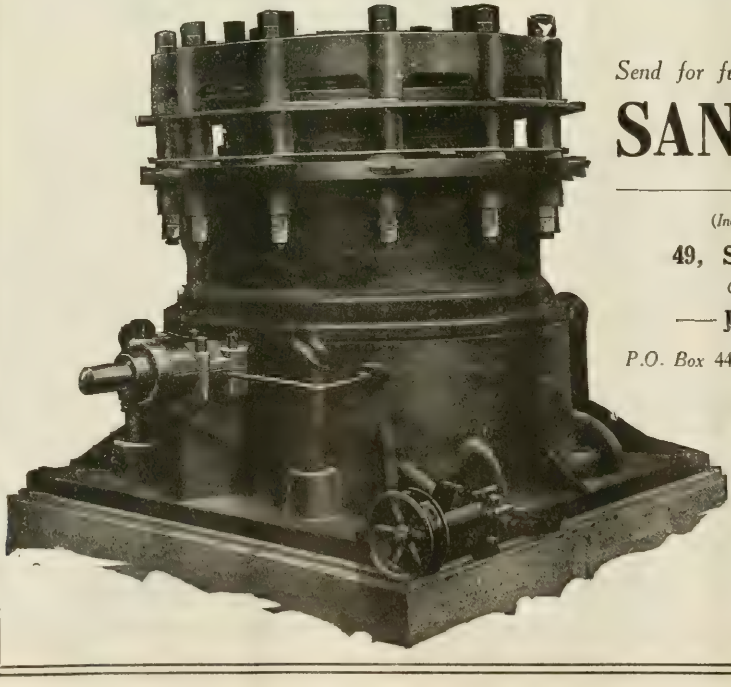

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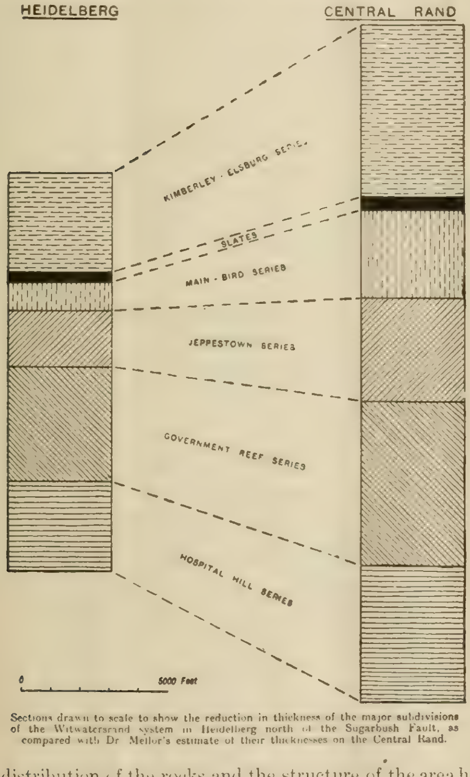
Heidelberg Geology.

DR. ROGERS' READING.

Dr. Rogers has now issued his paper on "The Geology of the Neighbourhood of Heidelberg," which was read recently before the Geological Society. With the paper is an excellent geological map of part of the Heidelberg district, reduced from field sheets. Dr. Rogers follows Dr. Mellor and other authorities in ascribing the three reefs which have acquired separate local names—to one and the same geological horizon—that is to say, that the Main Reef Leader, the Modder-Van Ryn and the Nigel are all the same reef series. In his paper he explains how some geologists and early observers may have misread the indications in the South-Eastern Rand.

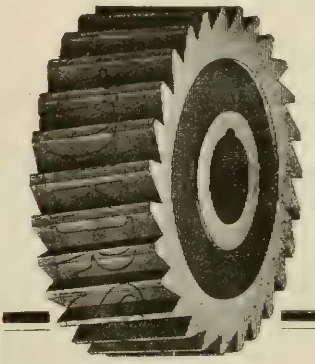
The paper describes the country between the Zuikerbosch Rand river, running south-west of Heidelberg, and the neighbourhood of Balfour, lying south-east of that town. When he read his paper, Dr. Rogers showed a map, on which the distribution of the rocks and the structure of the area have been laid down, and sections across the area were exhibited. The most important result obtained is the demonstration that (as Dr. Mellor predicted some years ago) each major sub-division of the Witwatersrand system diminishes in thickness southwards from the Rand, and that, in the country of which a geological survey has been made between the Klipriversberg and the Malan's Kraal-Tweefontein escarpment, there is no unconformity at the base of the Ventersdorp formation. The figures obtained for each major sub-division in Heidelberg are compared with the estimates made by Dr. Mellor on the Central Rand, and are as follows:—



Sections drawn to scale to show the reduction in thickness of the major subdivisions of the Witwatersrand system in Heidelberg north of the Sugarbush Fault, as compared with Dr Mellor's estimate of their thicknesses on the Central Rand.

	Central Rand. Feet.	Heidelberg. Feet.
Kimberley-Elsburg series	6,120	3,560
Kimberley slates	500	370
Main-Bird series	3,160	1,020
Jeppestown series	3,700	3,000
Government Reef series	6,220	4,090
Hospital Hill series	4,900	3,180
	24,600	14,220

We reproduce herewith Dr. Rogers' drawing illustrating the above figures.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Transvaal Silver and Base Metals.

PROGRESS REPORT.

Since the publication of the article on the above property in the June 11th issue of this Journal, a report on the progress of the Company has come to hand. The total footage accomplished during the quarter was 3,219½ feet, of which 750 feet were payable and averaged 13.2 per cent. lead and 12 ozs. silver per ton, and 1,450 feet unpayable averaging 1.5 per cent. lead and 1.4 ozs. silver per ton. In certain portions of the mine development has proved disappointing, while in others again high grade ore has been proved. This alternation of high and low value areas is a circumstance which accompanies ore bodies of a vein-like character in all mining localities. It is encouraging to note that the lode has again been found in the second level west drive in No. 1 shaft. In our previous account of the property mention was made of the difficulties accompanying the finding of a faulted lode in country rock such as is found at the mine. At the west of No. 2 mine a rich portion of the ore body exists which appears to widen out in depth. Development along the plane of the third level in this direction should be watched with interest as the available data seem to point to the presence of an ore chute. With regard to the surface plant the following is quoted from the report. Work on the new electrical plant is nearing completion. On the de-sulphurising and smelting plant the following has been done: The flues have been built, blower house and blowers installed, and the de-sulphurising pots completed with foundations. The concrete and steel work for the furnace houses and bins has been built and the furnace is in course of erection. All the concentration plant ordered from Europe has been either delivered on the property or is on the water.

Surface Equipment, Transvaal Silver and Base Metals.

Barberton Mining Activity.

The following particulars of mining for the month of June are supplied by Mr. L. G. Deglon, Secretary to the Barberton District Mine Owners' and Managers' Association:—Number of mines producing, 7; number of stamps working, 76; tube mills, 2; tons of ore treated, 3,749; fine gold (ozs.) recovered, 2245.476; value at £4.24773, £9,538; small mines and miscellaneous, fine gold ozs., 212.780, value £903; total output, fine gold, ozs., 2458.256, value £10,441; labour—whites, 167; coloured, 2,090; Chamber of Mines estimated value per fine oz., £5.375; claims held for month ended 30/6/21: Prospecting permits, 51; prospecting claims, 2,656; diggers' claims, 279; base metal claims, 23,241; total claims, 26,176.

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Science Stultified!

STRONG CRITICISM OF THE CIVIL SERVICE "SYSTEM."

By T. G. Trevor, A.R.S.M., Inspector of Mines.

The following extract from a strongly worded indictment of the treatment of the Scientist in the employ of the Union Government gains added weight by appearing in the official organ of the Department of Industries. It is written by Mr. T. G. Trevor, the Inspector of Mines for the Pretoria District, who certainly does not mince matters. It will be interesting to see whether the departmental heads will reply for themselves and the "system" which is so vigorously attacked.

From a scientific point of view South Africa is still practically unknown. The Observatory at the Cape is the only scientific institution which has been in existence long enough to have placed on record any considered and reliable results. There is not even a single reliable topographical map of the country published on which to record scientific observations, and in all other matters there is an equal lack of recorded knowledge.

The Scientific Government Service.

The present scientific branches of the Government Service have already done wonders, but they are still largely in the position of making ammunition for future use—such results as have already been obtained being a mere earnest of the future, just as the discoveries of Livingstone and the early explorers of Africa were only earnest of the later developments. If, however, science is to be of full advantage to the State, the position of scientific workers in the employment of the Government must be seriously considered, for prejudice dies hard. There are many men in Parliament and in high administrative positions in the Civil Service who hold science in exactly the same contempt as the Matabele induna held metallurgists, and this feeling is reflected in their attitude towards scientific workers.

The scientific man also is a difficult man to fit in to any hide-bound Civil Service system. If he is worth his salt as a scientist, he pursues his subject for its own sake, not for personal advancement or monetary reward; he has an absolute contempt for the rulings, regulations, and official forms, so dear to the perfect civil servant. All he asks for is freedom to pursue his researches in his own way without any interference from outside and to be personally credited with the results of his work and honoured accordingly. As to pay he is notoriously unselfish, but naturally he wishes to be secure in the tenure of his position, and to be able to afford to live at the same rate as other men with the same standards of life. These conditions are quite impossible of fulfilment in the present organisation of the Civil Service.

In the first place the efficiency of a civil servant, as judged by the Secretariats, depends almost solely on his compliance to rulings, regulations, and official forms. If he complies absolutely to these the wheels work smoothly he gives no trouble—and promotion and preferment follow in their ordained course. If he does not, no matter how brilliant or efficient in the salient points of his work he may be, the wheels revolve irregularly. The trouble is traced to him. He is a nuisance to the head office, and is accordingly apt to be "choked off" in every way.

The Unfavourable Position of the Civil Servant.

In the second place freedom of action is unknown to the Civil Service system. Everything and everybody is policed and shepherded by others, so that, for example, when a scientific officer is appointed, for a definite purpose at a definite salary, by the Public Service Commission, he has to get office and laboratory accommodation from the Public Works Department, who are quite uninterested in the efficiency of the accommodation provided. The secretary and auditor of his department, who know nothing about his work, have to authorise the purchase of his instruments and equipment, the expense of which the Treasury have to sanction, and the same instruments and equipment probably have to be purchased by the High Commissioner in London. The result of this system is that it may be months before a scientific officer, who is appointed to do definite work, receives the accommodation and equipment necessary for him to justify his appointment; in fact in some cases this accommodation and equipment is never satisfactorily supplied.

No Personal Credit.

In the third place the Civil Service system practically prevents any man getting personal credit—or blame—for his work. It seems specially designed to shelter incompetence and mask merit. For example: An officer on special work investigates a certain subject, which may be of intense interest from the point of view of that work, and in his opinion calculated eventually to lead to most important results. He reports on this. This report goes to his immediate chief, who, if he concurs, forwards it as it stands with his remarks, or possibly recasts it in his own words, and then forwards it under his own signature. This report is received by the Secretariat. The officers in the Secretariat all belong to the clerical and administrative branch and are only directly interested in administrative routine. They consist of a secretary, an under-secretary and various clerks, many of whom have power to sign for their chief. The report may be received by any one of these, and there is no security that the secretary ever sees it; even if, in

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course of time, it does come before the Minister, it only does so after having been carefully edited and commented on by every one through whose hands it has passed, and may bear an entirely different construction to that which its original author intended. If any action is then taken on the report this is probably done entirely independently of the original author. If success attends the action the department gets the praise, but if, as is usually the case, failure follows, then the responsibility is so divided that no one can be called to account.

Salaries.

With regard to pay and conditions of service these to-day are laid down by administrative officers, who have no idea of what attainments are really needed by a scientific officer in order to justify his appointment to a given post; hence, we frequently see advertisements for highly trained scientists for whom salaries are offered which would not be accepted by an uneducated artisan.

In the "Wanted" columns of a Johannesburg morning paper there recently appeared two advertisements—one for an analytical chemist for a Government department, and the other for a billiard marker for the Rand Club. The salary offered for the second was very much greater than that tendered for the first!

A Lesson of the War.

When the British Government, during the Great War period, found it necessary to call science to its assistance to win the War, it was at once realised that it was impossible to utilize science under the Civil Service Regulations. Scientific bodies, such as the National Physical Laboratories, were, therefore, taken over and subsidized, but were left entirely to manage their own affairs and appoint their own men. When anything was desired in their line the matter was referred to them and they were left to investigate it, and to produce the nearest approximation to the desired result they could. The principle worked excellently and was so successful that since the War it has been continued, and several other bodies, such as the Imperial Mineral Resources Bureau and the National Bureau of Entomology, have been founded to conduct scientific work in the interests of the Government and the Empire, but not included in the Civil Service or in the ordinary departments of State. The governing bodies of these institutions all consist of men of eminence in the science which the institution deals with, and in the case of the Mineral Bureau even the secretary and clerks are trained professional men.

To get the full value out of scientific research in the Union of South Africa some similar procedure is necessary.

Inefficiency and Overlapping.

The whole scientific staff employed by the Government should be appointed and directed by a council of scientific and professional men, directly responsible for its efficiency to the Government and provided for by a special vote. The present inefficiency and overlapping, which are notorious and arise, not through the fault of the various staffs, but from the system which controls them, would be done away with. There would be no overlapping or reduplicating of small laboratories. Those departments of State whose work justified a special scientific branch would have one attached to their work by the Scientific Bureau, but that branch would be part and parcel of the Bureau, and its officers would be definitely responsible for the accuracy and success of their work. By some method of this sort only can the full benefits of science be reaped by the State.

At the present time the armouries and munition factories of science are at the disposal of the State. These stores and factories are, to the future prosperity of South Africa, of far more importance than military equipment and munition factories can be; it is at least equally important that their direction and management should be in professional hands.

To place the forces of science under the control of a layman is just as futile as to place an army under the command of a civilian.—*S.A. Journal of Industries.*

Cape Asbestos.

A satisfactory expansion in the earnings of the Cape Asbestos Company is disclosed in the report for 1920. The accounts show a net profit, after providing for depreciation, taxation, and all other outgoings, of £25,378, which is, roundly, £5,000 more than in the previous year, and, with the balance forward, gives an available sum of £34,771, as compared with £26,503 in 1919 and £19,325 in 1918. The Ordinary dividend is maintained at 10 per cent., the sum of £13,525 (as against £5,000 last year) is added to reserve, and the slightly smaller amount of £9,136 is carried forward. Had the year closed as it opened, the company would have done very much better.

GOVERNMENT EXAMINATIONS.

METAL MANAGERS EXAM.: Last examination (May, 1921), **15** Metal Certificates were granted in South Africa, and of this number our students secured **10** certificates. Previous examination we secured **7** certificates from **8** entries, and in two other recent examinations **15** passes from **19** entries.

REMARKABLE AND CONSISTENT RESULTS.

COAL MANAGERS EXAM.: Last examination (May, 1921), we secured **3** certificates from **6** entries.

OVERSEAS EXAM: **21** certificates secured 1920, and **14** certificates to date, 1921.

SURVEY EXAM: We have secured practically **all** the certificates granted by the **Mines Department** during recent years and have obtained **60** certificates to date.

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Efficiency and Economy Underground.

A PLEA FOR MORE ATTENTION TO SHOVELLING AND TRAMMING IN THE MINES OF THE RAND.

By A. Hellawell.

Tramming and shovelling, according to Mr. Hellawell, are the dominating factors governing costs underground on the Rand. He contends that insufficient attention is given to the subject, and he certainly makes out a good case for a more careful study of this phase of underground economics.

My paper will be somewhat discursive, for the simple reason that in the department of mining I propose to discuss there are no fixed formulas that lend themselves to definite conclusions. And I do not propose to split economic and industrial straws while demonstrating where and how mine working costs can be reduced, and at the same time improve the margin of profit—which desirable end has not by any means followed lowered cost per ton milled in the past. It is below the collar of the shaft where existing conditions, both mechanical and physical, conduces to inefficiency and consequent high working costs. Nearly nine-tenths of the native labour force of a mine is employed underground, and fully two-thirds of the European staff. Fully two-thirds of the working expenses of a mine are incurred between the site of the haulage plant and the bottom of a mine. It is thus a reasonable deduction that high or low working costs are dominated by underground conditions. Mechanical efficiency underground, in all that relates to haulage and drilling machines, is more or less standardised. In many of the larger mines mechanical haulage on main tramming levels has been installed, with gratifying results—when the supply of broken rock reaches these main levels in sufficient tonnage to keep the haulage plant fully, and thus economically, employed. And this brings me to the weakest point of underground efficiency, *i.e.*, tramming and shovelling.

A Dominating Factor.

I have no hesitation in asserting that tramming and shovelling is the dominating factor that governs high or low costs underground. I do not think sufficient attention has been paid to this phase of mining, after admitting that the actual haulage on main tramming levels leaves little to be desired. But I do claim that not enough has been done on the subsidiary levels to cope with the conditions that make for stope faces being blocked up with broken rock while the reduction plant hangs up for want of tonnage—the rock that is holding up efficiency underground. Unsystematic shovelling in the stopes leaves masses of broken rock on the stope faces to the serious lowering of machine efficiency. Badly designed stope boxholes and bores, and bad tracks, on the subsidiary levels combine with the poor shovelling efficiency in the stopes to produce a condition of things that makes for a low and uncertain output. The masses of broken ore lying on the stope faces prevent miners rigging-up on the economic bench that will give rock-breaking efficiency to machine drill, to the steel employed, and to the air-compressor plant. The same thing applies in development faces. The miner has to waste drilling time clearing away the footwall so that he can rig-up his machine—loss of footage. Every ton of rock left in a mine at the end of the day's shift while the reduction plant is working below its capacity makes for an increase in general operating charges and in many ways has a numbing effect on efficiency, working costs, and profits.

The Loss to the Industry.

Miners will tell you that while stamps have been hung up for want of rock their stopes and drives have been so badly blocked up with broken rock that they lose many machine shifts per month cleaning up for benches and faces to rig-up on. I do not overstate the case when I assert that inefficient shovelling and tramming has cost the industry millions of pounds in wasted machine efficiency, and millions more in increased overhead charges per ton due to the hanging up of stamps for want of the rock that is blocking up stope faces, and hindering underground working efficiency generally. Even when enough rock has been lashed down for the day's run a new hindrance to efficiency intrudes itself in most mines owing to badly planned boxholes and boxes. Unless the reef is being carried high above the drive, a makeshift type of box is put in that will not hold a ton of rock, and on a grade that prevents the rock running by gravity into the trucks. There will be two or three trucks waiting to fill, a boy has to get into the box to shovel out the rock, and the trucks have to wait for the box being refilled, and so much valuable time is lost again. And when the trucks do start for the tip bad tracks often upset them on the way.

Deficiencies of Present System.

Much has been done during the past fifteen years or so to improve tramming conditions by the system of ore-passes, or chutes, and the introduction of mechanical haulage. Yet if one-tenth of the capital spent on mechanical haulage and ore-passes had been spent at *the same time* on improved stope boxes and improved tracks on the subsidiary levels the industry to-day would be reaping the fuller benefits of mechanical haulage and the big milling policy—which it is not. The existing methods of working out shovelling and tramming costs and efficiency is more or less useless for comparative purposes—yet competition is the soul of efficiency. Possibly few mines lend themselves to exact comparison of cost owing to the very different conditions that exist in flat mines as against steep mines, wet mines and dry mines, mines with narrow reefs and those with wide reefs, and mines with good footwalls and mines with broken footwalls. Nor can we standardise methods of getting out rock as can be done with breaking it. Different types of mines call for different methods of handling broken rock, sometimes calling for capital expenditure on a considerable scale on one class of mine to deal with conditions that on another mine is merely a question of brute force. But comparison and competition can be organised with great advantage on each particular mine.

Some Efficiency Figures.

The best practical test of efficiency for comparative purposes is on the basis of tons per unit of labour employed on the work per shift. *Vide* available figures, and from personal knowledge, the present figure of efficiency rarely exceeds two tons per unit of native labour per shift. For comparative purposes, and also to establish and fortify my line of reasoning, I offer the following figures of efficiency that existed on several mines during the past 15 years or so. At the Village Main Reef at the end of 1904 and early in 1905 (and possibly later, but not before) the figure of efficiency was 3·25 tons per unit of labour employed on shovelling and tramming. After the Boer War the mill had never, or rarely, run over the week-ends, owing to lack of ore, until September or October, 1904. In January, 1905, the then manager had to give strong orders to his underground staff not to allow the mill bins to be filled by Tuesdays, as he could not control his grade.

The New Kleinfontein mine in the first half of 1905 had stamps constantly hung up for want of ore. In June, July, August, and part of September of that year the mill did not once hang up for want of ore—the bins were always full by midday Saturday while the headgear bins and incline shaft bins were also more or less full when the shift came up. The figure of efficiency of shovelling and tramming was 3·35 tons per unit of labour per shift, and during those months the profits were nearly treble that of prior months.

In 1908-9 the Miner shaft of the Simmer Deep showed a figure of efficiency of 4·95 tons per unit of labour per shift, and in the first half of 1909 the whole mine had a figure of 3·75 tons per unit of labour. Incidentally the Simmer Deep declared its only dividend (I believe) that same year.

On each of the three mines mentioned the general underground conditions were excellent. Machine efficiency was high, for machinemen could rig-up on any bench they desired in their stopes; hammer boys were putting up some excellent drilling figures because they had not to waste hours lashing a place clean before they could drill; and development footage in each of the mines was being publicly noted. Yet very shortly after the dates mentioned on the last two named mines stamps were hung up for rock again and the figure of efficiency had fallen to about two tons, and less. I claim to be proving that the figure of efficiency of tramming and shovelling has a direct relation to operating costs generally —in other words, that efficient shovelling and tramming maintains haulage costs, rock-breaking costs, development costs, and reduction costs, on the true economic basis on which the mine was laid out and its plant designed, and gives the mine full-capacity efficiency.

Conditions to Blame.

I do not question the ability or zeal of the mine official. It is more a question of peculiar local conditions that is at fault. The native labourer is a difficult factor when his efficiency is not definitely measureable; and the bulk of that labour does not remain long enough at the mines to make efficiency a permanent factor. Yet one has to say that the average mine official will smile incredulously at anyone who talks of systemising shovelling and tramming. Possibly mine officials who read this paper will be disposed to question the actual working conditions under which the quoted efficiency was arrived at on the mines mentioned. Chamber of Mines records will to some extent support my statement. It may be suggested that all labour employed in shifting broken ground was not charged up against tramming and shovelling, and that hammer boys were kept unduly long lashing down before they started drilling. In the mines mentioned, at that time, a system of bonus for hammer boys for inches drilled was in force, and it was a standing order that they should be started on their holes at the earliest possible moment. All boys at the station grizzlies, and boss-boys in the drives and stopes were charged against tramming costs, as were all shovels, picks, big hammers, and candles used on the work. With all such charges the actual cost of shovelling and tramming was 10d. per ton on the Simmer Deep, and 1s. 3d. per ton at the Village Main Reef.

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BRAND
ANTIFRICTION GREASE

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Manufactured by
South African Lubricants & Chemical Works, Ltd.,
DURBAN & JOHANNESBURG.
Phone 1618, Johannesburg Branch Office.

Some Conclusions.

Therefore I claim that the most effective means of starting on a systematic reduction of working costs *that will result in higher profits*, is to organise ore out of a mine to a full capacity of the reduction plant. A penny or so per ton extra on shovelling and tramming will repay itself many times over in increased efficiency of rock drilling, rock breaking, and by the lowered overhead charges of haulage, pumping, and surface charges generally.

To sum up, I claim the results outlined can be achieved by constant attention to the following points:—

(a) Have plenty of good shovels down the mine, and plenty of light.
(b) Make trammers and shift bosses responsible that all work-faces are lashed down before miners go down.
(c) Make timber men put in self-emptying stope boxes of not less than two ton capacity, and more when possible.
(d) If stope footwall is low on the drive put shovelling platforms *inside* the stopes so that boxes can be set on a grade that will allow the rock to run by gravity.
(e) Make platelayers keep tracks in efficient running order, and don't be afraid of spending money on rails when they are needed—it pays.
(f) Organise a system of bonus for all concerned when the month's tonnage milled bears a fair relation to tons broken—without loss of grade.

I claim that successful and efficient shovelling and tramming makes the successful mine.

Swaziland Coal.

Writing to the *Pretoria News* to complain of the tax on mineral rights in Swaziland, a correspondent says: The most important mineral in Swaziland is coal. The whole of the Lebombo flats is one vast coalbed many hundred square miles in extent. This brings me to the question of railways. The only thing in my opinion to create activity among the Swaziland mineral owners is to provide them with rail transport. The long-talked-of Swaziland line, if constructed, would open up the great coal belt and provide the Resident Commissioner with greater revenues than he ever dreamt of. Because of the delay in constructing the line to connect up with the Portuguese railway line, one company formed to open up the coal on their property, and in which a large sum of foreign capital was invested, was forced years ago into liquidation.

REPRESENTATIVE WANTED.
The old-established firm of Louis De Naeyer, of Willebroeck, Belgium, Manufacturers of Steam Boilers, Ice Making and Refrigerating Machinery, are desirous of appointing a reliable Agent in the Union of South Africa.
Applications, with full particulars and references, to be forwarded to:
LOUIS DE NAEYER,
Willebroeck, Belgium.

New Companies.

A YEAR'S REGISTRATIONS.

We are indebted to the excellently produced annual report of the Chamber of Mines for the following particulars of company registrations at Pretoria in 1920. It will be noted that new diamond companies were second only to commercial companies in the amount of new capital raised. New capital for gold mines is a regrettably insignificant portion of the whole.

Four hundred and twenty-six companies and syndicates, with nominal capital aggregating £17,320,475, were registered in Pretoria during the year 1920. Of these companies, 67, with nominal capital amounting to £11,583,800, were registered in Pretoria as "Foreign"; 27 companies, with capital amounting to £2,627,700, as "Public" companies; 9 under Section 21, Article 21, with nominal capital of £333; and 323 companies and syndicates, with nominal capital aggregating £3,108,642, as Private companies.

The nature of the businesses carried on by these companies, so far as the names registered signify, is indicated under the following headings:—

	Companies.	Nominal Capital.
Asbestos	2	£30,000
Base Metals	1	1,500
Cattle Ranching	1	100,000
Coal	7	457,800
Commercial	294	6,512,625
Cotton Growing	1	60,000
Diamonds	24	5,934,750
Financial	9	1,298,000
Gold	5	349,900
Industrial	48	1,113,800
Land	11	154,850
Lead and Silver	3	231,500
Mining	8	309,000
Oils	3	289,000
Orange Growing	1	10,000
Petroleum	1	150,000
Platinum	2	102,750
Tin	2	11,000
Tree Planting	2	4,000
Vanadium and Lead... ...	1	200,000
	426	£17,320,475

Liquidations, Dissolutions, etc.

During 1920 there were 152 companies, with nominal capital amounting to £4,014,191, that went into liquidation, or were dissolved (50 with nominal capital of £413,780). These companies may be classified as follow:—

	Companies.	Nominal Capital.
Coal	2	£46,500
Commercial	118	1,109,320
Financial	3	19,000
Gold	10	2,543,471
Industrial	11	85,000
Land	5	189,900
Oil	1	8,000
Tin	2	13,000
Total	152	£4,014,191

Alterations of Capital.

One hundred companies increased their capital by £6,174,289. The nature of the business of these companies and the amount of increases of capital are shown in the following list:—

	Companies.	Amount of Increase of Capital.
Aikali	1	£35,000
Citrus Farms	1	40,000
Coal	4	251,550
Commercial	63	947,302
Diamonds	2	23,750
Financial	3	2,551,000
Fruit Farms	1	1,000
Gold	8	1,337,417
Industrial	10	507,000
Land	3	449,020
Plantation	1	3,000
Platium	1	12,250
Talc	1	13,000
Tin	1	3,000
	100	£6,174,289

Pretoria Silvers.

The option period has been extended for a further six months, i.e., up to March 21st, 1922.

THE BALDWIN LOCOMOTIVE WORKS

(OF PHILADELPHIA, PENNSYLVANIA, U.S.A.)

BUILDERS OF LOCOMOTIVES SINCE 1831.

STEAM, ELECTRIC & INTERNAL COMBUSTION LOCOMOTIVES.

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Mine Ventilation.

MR. CLIFFORD'S "SERIOUS EVIDENCE"—"THOROUGH ENQUIRY" IN PROGRESS.

The origin of the official enquiry into mine ventilation to which we referred some time ago appears to be the Miners' Phthisis Commission. In the course of its recently-issued report that body comments strongly on the ventilation conditions on the mines, and recommends drastic measures. *Inter alia*, the report says:—

The important part which ventilation plays in preventing miners' phthisis has only comparatively recently come to be properly appreciated whereas in coal mines where defective ventilation may lead to explosions resulting in loss of life the necessity for thorough ventilation has always been obvious. The newer mines on the Rand have in this respect an advantage in having the opportunity of suiting their layout to ventilation requirements, with the result that fairly satisfactory conditions are found on them. On the other hand, many of the mines, more especially some of the older ones, cannot be said to be satisfactory from this point of view. The evidence with regard to some of them is that if proper ventilation be insisted upon they would have to close down. Mr. Clifford, Chairman of the Standing Committee on Dust Sampling of the Chamber of Mines, and Consulting Engineer to the Central Mining and Investment Corporation, in his evidence at page 211 stated:—" I should like to point out, however, that in regard to the existing ventilation in the case of some of the older mines that it is not easy to make much improvement. Some of those have grown to such an extent that the original provision for ventilation is no longer adequate, and it is a matter of impossibility in the case of these older mines to satisfactorily ventilate them. We do not hope for much improvement there, but what we are insisting on now is that in the case of the newer mines they must make special provision. And in this connection I may tell you that, as showing the amount of provision we have to make in this direction that on the New Modderfontein there is a special shaft sunk for ventilation purposes only with its own fan. On the City Deep there is also a shaft about 2,500 feet deep, which cost over £100,000, and that is sunk for no other purpose but ventilation. I am just quoting these cases to the Commission to show what has been done and what is being done where we are dealing with the new mines and where it is possible from the beginning to provide for this. But in the older mines, as I have already explained, it is a matter of great difficulty, in fact of impossibility, to make them really satisfactory from the standpoint of ventilation. In many cases, too, the financial question is the dominant one." Evidence such as this, which is couched in general terms, is of so serious a nature that the Commission did not consider that we would be discharging our duties under this term of reference if we allowed it to rest at that without ascertaining in detail to what mines this statement applies, in what respect the ventilation of each particular mine was considered to be defective, and what remedies should be applied. With this object in view, your Commission addressed the following letter to the Government Mining Engineer, who concurs in the steps proposed by us:—" The Commission has noted with approval the institution of systematic inspections by your staff of all mines on the phthisis list, as outlined in Section VIII. of your Annual Report for the year 1919. The Commission desires to be supplied with a copy of each systematic report when completed."

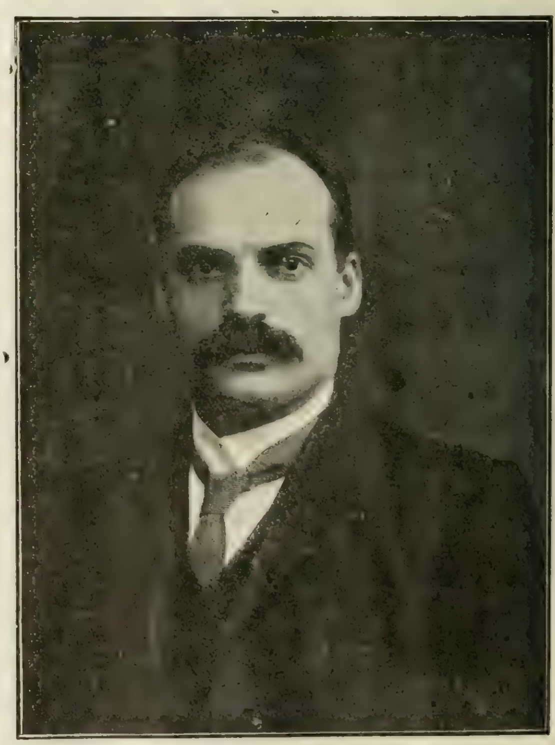
" The Commission suggests that, when making his investigation, the inspector furnishing the report should pay particular attention to the points in the mine where conditions are found to be, or are likely to be, unsatisfactory in respect either of dust or of ventilation. The inspector should indicate what steps ought to be taken to ameliorate these conditions, and, where the cost of carrying them into effect is considerable, an estimate should be made of the cost, so as to enable the Commission to judge what measures could be adopted.

" The Commission also suggests that the report would carry greater weight if more than one inspector collaborated in the work, especially in those portions of it referring to unsatisfactory conditions."

The Commission is of opinion that only good can result from facing the position and ascertaining exactly what conditions are still unsatisfactory, as also what it would cost to remedy these conditions. It notes that the inspectors whose reports on systematic inspections have so far come in appear largely to confine their attention to whether the phthisis regulations are observed or not. In view of the evidence of Mr. Clifford quoted above, it is of opinion that they should extend the scope of their investigations to include a thorough enquiry into the ventilation on each mine and in what respect it is defective, with suggestions as to how to remedy these defective conditions.

A Joint Committee drawn from the Mines Department and the Chamber of Mines is now investigating on the lines recommended by the Commission.

Visiting the Rand.



The Acting Prime Minister and Minister of Mines, who has been visiting the Rand this week.

Prospecting Activity in the Northern Transvaal.

Prospecting has been very actively carried on by the Dominion Syndicate on the Sand River, in the Zoutpansberg district, near Lilliput, about 18 miles from Messina. Already considerable success has been met with, discoveries of asbestos, potash, chrome iron, high-grade lime, and copper having been made. These finds are in the vicinity of the Lilliput coal workings of the Messina Company, and transfers of the various holdings are now being completed with a view to future development.

A Copper Discovery on the Farm Elgin, in the Messina District.

Prospecting on the Sand River.

Oil Prospecting in Australia.

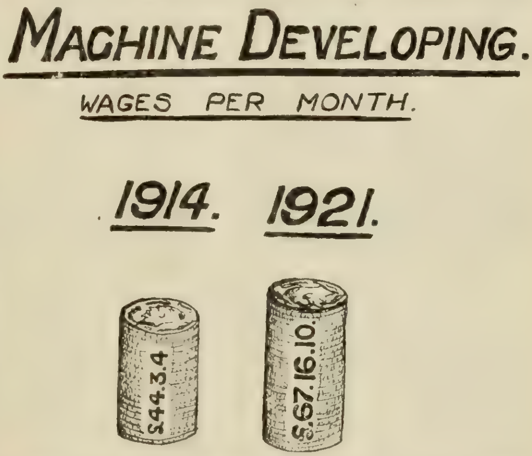
There is an obvious lesson for South Africa in the fact that the reward of £50,000 offered by the Australian Government for the discovery of oil in payable quantities within the Commonwealth is promoting much activity in the search for oil in almost every part of the country. In addition to the boring operations which for some time have been conducted by the Commonwealth Government in Papua (New Guinea), the Home and Territories Department has granted a number of applications for leases of large areas for prospecting purposes in the Northern Territory, where indications are considered to amply justify investigations on a large scale. Numerous companies have been formed in every State, some of which—in New South Wales, Queensland, Western Australia, and South Australia—have already started boring operations, and are all very hopeful of ultimately locating large supplies of this valuable commodity.

The Spectacular Rise in Rand Miners' Wages.

Much information has been published on the subject of increased wages during the years 1914 to 1921 on Rand mines. The statistics have reflected the improvements in the economic position of labour set up by the adverse circumstances accompanying the war. Some of the more notable increases are as follows:—

	1914.	1921.	Per Cent. Increase.
Machine Stoping ...	£34 , 8	£64 16 0	88.6
Timbering and Stone Walling	£17 7 11	£35 11 1	104.9
Winch Attendants ...	£12 14 5	£29 17 7	134.9
Milling	£20 12 1	£39 6 3	90.8

The change in the cost of living has been the chief factor which brought about this increase in wages granted by the Chamber of Mines. These increases were effected only at considerable expense to the industry, and up to the present the bargain seems to have been one-sided. Have the workers in any way improved their efficiency in exchange for the increased wages received? The answer is only too clear. Some mines have had to close down, due mainly to increased working costs, proving clearly that there has not been a corresponding increase in efficiency to neutralise these increased costs.



A sketch to scale showing how the machine developer's wage has grown on a typical mine, the Village Deep. Taken from official figures.

MINES DEPT. EXAMS.
CERTIFICATES AWARDED INSTITUTE.

OVERSEERS' CERTIFICATES (Metal).
Our Passes Rest of S.A.
1920 (12 months) 66% 34%
1921 (6 months) 64% 36%
No failures for 6 months, 1921.

MANAGERS' CERTIFICATES.—Our record is 100% passes. 1912-20 *we claimed* 165 *certificates*; 40 *in* 1919-20; *last* 3 *Exams.*, 29 *certificates* (*total*). 10 *Coal Certificates in last* 3 *Exams.*

TUITION (Metal or Coal) by class, correspondence or privately.
The above passes are based on official returns; any claims based on number of entries are obviously unreliable.

Mining Institute (Prot. Yates),
St. James' Mansions, Eloff St.

July Gold Output : Group Returns.

CENTRAL MINING/RAND MINES GROUP.

Results of crushing operations for the month of July, 1921 :—

Company.	Tons crushed.	Yield in Fine Gold Ozs.	Estimated Value.	Estimated Profit.	Estimated Working Costs per Ton.
City Deep	84,000	35,578	£197,901	£67,167	31/ 1
Cons. Main Reef	50,700	17,660	98,232	19,761	30/11
Crown Mines ..	201,000	59,092	328,699	80,933	24/ 7
Dur. Rood. Dp.	27,400	9,448	52,554	6,578	33/ 6
E.R.P.M.	127,000	34,252	190,428	15,091	27/ 7
Ferreira Deep ..	32,300	10,022	55,748	14,551	25/ 6
Geldenhuis Dp.	51,387	13,324	74,115	3,713	27/ 4
Knight Central.	28,600	6,761	37,313	3,787	23/ 5
Modder B.	59,000	33,047	183,824	107,166	25/11
Modder East ...	26,350	10,172	56,584	10,307	35/ 1
New Modder ...	96,000	45,454	251,062	141,853	22/ 9
Nourse Mines ..	43,400	13,501	75,102	7,366	31/ 2
Robinson	38,000	7,571	41,732	2,790	20/ 5
Rose Deep	54,400	13,292	73,938	13,116	22/ 4
Wolhuter	33,500	8,278	46,049	6,824	23/ 5
Village Deep ...	50,000	16,112	89,625	17,249	28/11
Tls. & averages	1,003,037	333,564	1,852,906	518,252	26/ 7

General Note.—The valuation of gold has been taken at £5 11s. 3d. net per fine oz.

Modder East.—Decrease chiefly due to lower yield and higher costs occasioned by larger tonnage taken from mine and reduced tonnage from surface dumps. 31,266 tons handled at the mine, of which 25,325 from stopes, 1,296 sorted at the mine; total transported to Apex 29,970, sorted at Apex 3,970.

BARNATO GROUP.

Mine.	Tons Crushed.	Revenue from Gold
Consolidated Langlaagte	42,300	£71,673
Government Areas	140,000	297,622
Langlaagte Estate	40,300	69,991
New Primrose	22,000	26,315
New Unified	11,500	13,536
Randfontein Central	127,000	211,792
Van Ryn Deep	49,300	148,588
Witwatersrand	37,700	52,862
Totals and averages	470,100	£892,379
June totals	458,200	£846,494

Mine.	Total Working Costs.	Working Costs per Ton Milled Shillings.	Gross Profit including Sundry Revenue.
Consolidated Langlaagte ..	£51,378	24·292	£20,557
Government Areas	148,033	21·147	150,286
Langlaagte Estate	52,462	26·036	17,726
New Primrose	21,319	19·381	5,166
New Unified	11,297	19·647	2,292
Randfontein Central	169,305	26·662	43,661
Van Ryn Deep	67,883	27·536	82,001
Witwatersrand	44,448	23·580	10,014
Totals and averages ...	£566,125	24·085	£331,703
June totals	£570,376	24·896	£281,801

Note.—The above results are arrived at by calculating the gold at £5 12s. 6d. per fine oz.

Monthly Gross Profits.—January, £269,638; February, £187,423; March, £253,627; April, £261,506; May, £250,900; June, £281,801; July, £331,703.

GENERAL MINING & FINANCE GROUP.

The July operations of the producing mines of this group were as follow :—

Company.	Tons Crushed.	Total Cost.	Cost per Ton.	Total Revenue.	Profit.
Aurora West.. ..	10,680	£14,654	27·44	£15,918	£1,264
Meyer & Charl.	13,500	17,495	25·92	43,000	25,505
New Goch	17,000	19,332	22·74	20,540	1,208
Roodepoort Un.	22,600	25,656	22·70	25,971	315
Van Ryn Est. .	33,400	40,476	24·24	51,001	10,525
West Rand Cn.	32,000	44,423	27·76	50,046	5,623
	129,180	£162,036	25·09	£206,476	£44,440

In calculating the revenue, gold has been taken at a value of £5 12s. 6d. per fine oz., less estimated realisation charges.

CONSOLIDATED MINES SELECTION GROUP.

The following are the results of operations for the month of July, 1921 :—

	Stamps Working.	Tons Milled.	Working Costs per Ton Milled.
Brakpan Mines	110	58,000	26/ 7·945
Springs Mines	80	40,000	28/10·268
Totals and averages	190	98,000	27/ 6·688

	Value of Gold declared.	Yield per Ton.	Working Profit based on standard value of Gold.	Working Profit per Ton.
Brakpan Mines ...	£92,571	31/11·051	£15,251	5/3·106
Springs Mines ..	78,356	39/ 2·137	20,645	10/3·869
Totals and averages	£170,927	34/10·597	£35,896	7/3·909

	Estimated Premium. taking Gold at £5 12s. 6d. per fine oz.	Total Estimated Profit.
Brakpan Mines	£29,146	£44,397
Springs Mines	24,880	45,525
Totals and averages	£54,026	£89,922

Brakpan.—Placed to gold reserve, 3,592 fine ozs.

CONSOLIDATED GOLD FIELDS.

The following are particulars in regard to the outputs for the month of July, 1921, of the undermentioned companies of the Consolidated Gold Fields Group :—

Company.	Stamps. Running.	Tube Mills.	Tons Crushed.	Gold declared. Fine ozs.	Profit.
Simmer and Jack ..	320	7	57,500	13,251	£13,730
Robinson Deep ...	155	10	60,200	17,759	25,142
Sub Nigel	30	2	10,000	5,461	6,301
Totals	505	19	127,700	36,471	£45,173

Gold in Reserve.—Simmer and Jack, 1,200 ozs.; Robinson Deep, 900 ozs.; Sub Nigel, 2,013 ozs.; total, 4,113 ozs.

The revenue derived from gold for the month of July, 1921, is calculated at the rate of £5 12s. 6d. per fine oz., less estimated gold realisation and exchange charges of 6d., or a net figure of £5 12s. per fine oz.

TRANSVAAL GOLD MINING ESTATES.

Output for July, 1921 :—Central Mines: Tons crushed, 12,400; yield, 3,154 fine ozs. Elandsdrift Mine: Tons crushed, 1,600; yield, 883 fine ozs. Vaalhoek Mine: Tons crushed, 2,010; yield, 627 fine ozs. Estimated value of month's output, £25,878. Estimated profit for month, £2,354. Note: The month's results are based on value of gold of £5 11s. net per fine oz.

Letters to the Editor.

MINE OFFICIALS' SALARIES.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—Would you be so good as publish the gist of the accompanying letter, or embody the matter of it in one of your most interesting articles. During the past week we have been deluged to saturation by the Chamber of Mines with figures which, to the thinking man not directly affected, shows—from their point of view—the justice of their cause for a reduction of wages. This, however, only refers to "non-officials."

They claim it is not so much a reduction of wages they want as a lowering of cost all round. I would suggest that they publish a supplementary statement showing salaries and emoluments of those in "official" positions. I hold that he is an extraordinary man who, making no further contribution to a concern than his labour, is worth twice as much as the ordinary man. For as I judge the "officials" on the mines are a very ordinary lot indeed, and having no more than a "Come night, come ninepence" interest in the various concerns in which they hold office. Yet some hold positions that with salary, house, emoluments, and perquisites amount to four times the wages paid to the workmen.

This, in my opinion, is not fair. If our trade union friends would concentrate for a more equitable divide there would be more left to save the low grade mines than a fractional reduction of the workers' wages. As we know the Chamber to be a great stickler for gaining and retaining a good name for fairness, it will be sufficient to make the suggestion for them to show the cost per ton absorbed by "official" salaries, as they have already done by the more humble wage-earning workman.—Yours, etc.,

EXPECTANT.

[We understand that the officials have accepted an all-round reduction in salaries without demur.—Editor.]

A MINE DEVELOPER'S VIEWS.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—I observe from the very excellent diagram published in your issue of 6th inst. (p. 1,593) that out of the £11,666,709 representing increase of working costs over 1914, £5,000,000 is due to increased European labour, leaving £6,666,709 increase unaccounted for. It is incumbent on the Chamber of Mines, while asking Labour to reduce its rate, to show what it has done indirectly for Labour by scientific investigation and the fostering of local industries so as to increase opportunities for employment. On several occasions the Mines and Industries Department has been invited to take steps in this direction, but apparently it is still awaiting the sanction of the Mining Industry or those who are in financial control. A further interesting inquiry might be made as to whether any of the interests representing the Chamber of Mines are also interested in the supply of "stores," *i.e.*, in the increase of costs of £6,666,709. It is of the utmost importance that Labour should realise that it must give an honourable return for wages paid. This view is the more likely to prevail when Labour realises that the Chamber of Mines on behalf of the Mining Industry is also giving honourable service for its wages.—Yours, etc.,

MINE DEVELOPER.

WIRE ROPE RESEARCH.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—The article on wire rope research in the *Mining Journal* of July 30th, 1921, says: "*Further information, which would lead to a closer estimate of when a rope is unsafe, and therefore should be removed, would be very valuable.*"

If I am not trespassing, I wish to give you my experience in this matter. About 15 or 16 years ago I was subpoenaed to give evidence before the Rope and Safety Commission at the Chamber of Mines. I then said there was *no real* safety factor attached to any winding or haulage rope, as periodical testing of the end of the rope attached to its load was not a real test, as that part of rope got no wear; but when possible, a test for breaking strength should be taken off that part of the rope which comes in contact with the sheave or pulley wheel. The best safety policy applicable to any rope is careful watching, overhauling, and lubricating. Lubrication to any winding rope is as important as oil and grease to the engine. All grease should adhere to the rope and not fly off when in contact with the sheave wheels or engine. Such lubrication should be applied when required, thereby giving the wire rope no chance to corrode. Corrosion and broken wires are visible, but re-crystallization is not visible. There are many ways a rope can become re-crystallized in places in a very short time, such as where bearing hard on the side of the drum with fast winding, or where wearing hard over any substance and thereby forming a sharp short bend in rope; also where part of rope is lying on sheave wheels and part of rope is taking its load on engine, when skip, etc., are loading at their lowest point. For instance, you have a wire rope, say, 180 tons B.S. pulling rock from a depth of 4,000 feet with an 8-ton skip. The actual load on the rope at the engine may exceed 30 tons with full weight of rock, skip and wire rope, leaving only a safety factor of 6 to 1. Should the rock skip at any time at its lowest point come to rest, and the engine starting up fast take its load, it forms at the time a severe jar in that particular place. This is very noticeable when the rope is taken off the engine. Take a compound shaft where the cage or skip with fast winding takes the bend from incline to vertical: you will find re-crystallization taking place in that part of the rope just on the sheave on the headgear and on the engine. To prevent strain, wear, and re-crystallization continuing in places, I have re-capped very often the end of the rope fastened to the engine, and later on reversed the rope end for end. By practical experience I have more than doubled the life of the rope in this way, and both ends of wire ropes have stood the tests well. A few years ago six ropes, each 2 in. diameter and from 3,500 feet to 4,200 feet in length, were discarded after doing about 1,300 million foot tons in over three years. There were five different makes of ropes: two made up in triple compound, Lang's lay with 6 x 49 wires to the rope B.S. 207 tons, when new. The other four ropes were of different make, 2 in. diameter in ordinary lay triple compound, but 6 x 31 wires and only about 185 ton breaking strength when new All ropes had a good hemp core. The four different makes of rope with ordinary lay gave the best satisfaction. The Lang's lay had a tendency to open up its lay in wires as well as strands, and corrosion was difficult to prevent. After unusual stretching of wire ropes after having been in use for such a long time, and doing more work than any rope I have ever known of, I had each rope discarded. A test of each rope before being discarded gave wonderfully good results: the worst of the ropes decreasing from 185 tons to 143 tons breaking strength. I maintain this is the best safety indicator: when a rope restarts stretching, when once stopped, then there is something wrong somewhere; the rope should be discarded; it can be used elsewhere where no danger is attached. I have had new ropes discarded at no fault of the makers of the rope. As an instance, a few years ago I received a spare rope, 9,000 feet, 1½ in., 6 x 15 wires, Lang's lay, B.S. 55 tons. The rope was cut in two pieces, and each piece, 4,500 feet long, was put on the same single hoist, in a compound shaft. The first rope was condemned for hauling men after 28 days' use, was discarded and taken off the engine after 59 days' use. A sample of the rope, about 60 feet from the skip, broke at 23 tons. The other half of the same rope was put on the same hoist to take its place, and after 15 months' work, doing about 230 million foot tons, it was taken off the engine to be used as a mechanical haulage rope. Test of rope when discarded, taken 60 feet from the skip, gave 52 ton breaking strength. The first half of the rope when put on the mechanical haulage broke almost at once, but the second half did about eight months' work on the mechanical haulage, and even after that was reclaimed for holding up sand-filling underground. The cause of the first rope losing its life in such a short time was corrosion taking place very rapidly. The rope was fairly well greased, but only by examination could the corrosion be noticed. The grease used for lubrication retained the water and acid from the shaft. The grease itself contained no acid when put on hot in the usual way to the rope. Good lubrication, as mentioned before, is the best preventative for corrosion and wear. A well lubricated rope when discarded is as bright as when first put on. The full cost of lubrication and maintenance of a rope is not much. With regard to new winding ropes breaking through other causes, as said before, there is no real preventative. Some time ago I had a new rope, 1⅛ in. diameter, 6 x 15 wires, Lang's lay, B.S. 55 ton guaranteed breaking. It broke 42 feet from a light and empty cage, and according to the indicator on the engine and marks on the drum there were only 9 feet of slack winding rope in the shaft. There was a bad place in the vertical shaft well known to the engine driver, and as soon as he felt the load of the rope he stopped, but before the engine could be reversed the cage, although light and empty, fell away. I had no spare rope in stock, and had to make the best of it. Men were warned not to ride on the same rope until thoroughly tested. I recapped the rope 60 feet from the break. Two samples of rope from each side of the break were forwarded for Government test and inspection, and each test piece stood 57 ton breaking strength. This was most unusual. The break in the rope was, from the first till the last broken wires, three feet long, and the top part of the broken wires was almost perfectly straight. The bottom half of the break I could not describe, as with the cage falling down the shaft with 42 feet of rope the broken part got knocked about. After one week's hard pulling of rock with a 4-ton skip from a depth of over 4,000 feet men were allowed to ride on the rope again, and it did over one year's service like this. I maintain always use as big a rope as possible as the wheels, engine, etc., will allow. Try to get a bigger safety factor than 6 to 1 allows. For a plough steel rope, fairly flexible, I have found that if the sheave wheels are six times (in feet), double the circumference of the wire rope in inches, the rope will do well. a large number of small wires to a rope, or a smaller number of larger wires depends merely on the use to which the rope is to be put. For instance, taking a rope constructed of 42 wires and another rope of the same diameter constructed of 90 wires, I maintain that there is more life and safety attached to the rope composed of 42 wires on an incline shaft, as the larger wires will resist wear and tear better than small wires; but for vertical shaft work that rope will not be as good as one with a larger number of small wires. The small wires, if constructed in compound, will withstand shocks from the engine and other causes better than the bigger, which would not have the elasticity to avoid shocks to the same extent. A rope 2 in. diameter, containing about 300 wires constructed in triple compound, is a comfort to ride on. Should this be of any use to the readers of the *Mining Journal*, and if there is any doubt about my writing, then I am willing to give actual proof, also much more if required of my 28 years' experience of wire ropes on the Rand.—Yours, etc.,

C. M. RASMUSSEN.

Simmer and Jack G.M.,
Germiston, 4th August, 1921.

Chicago-Gaika Development.

The report of Chicago-Gaika Development Company for 1920 states that royalty received from tribute of Primrose claims was £1,827. Company's interest in Connemara Mine remains unchanged; 40,724 tons were treated, of a value of £48,000, and development work now being carried on indicates opening up of further payable ore. Revenue from interest in Birthday Mine was £11,902. During the year 2,696 tons of fibre were sold, and for the present year to end of June sales were 1,567 tons.

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The July Output.

SUBSTANTIAL INCREASE.

The Transvaal gold production in July amounted to 689,555 ozs., as against 678,490 ozs. in June, an increase of 11,065 ozs. The estimated value of the July output at £5 12s. 6d. per ounce is £3,878,747, as against £3,646,884 (£5 7s. 6d. per ounce) in June, an increase of £231,863. The group profits for the past month total £1,150,150, an increase of £178,672 compared with June. The number of boys at work on the gold mines in July was 166,999 compared with 168,152 in the previous month.

Appended are the output totals for July compared with those for June:—

Witwatersrand.

	Ozs.
July	673,475
June	663,383
Increase	10,092

Outside Districts.

July	16,080
June	15,107
Increase	973

Grand Total.

July	689,555
June	678,490
Increase	11,065

The principal individual increases in July were: Crown Mines, 4,762 ozs.; Govt. Areas, 1,645 ozs.; E.R.P.M., 1,218 ozs.; Brakpan Mines, 938 ozs.; Geldenhuis Deep, 901 ozs.; and Village Deep, 900 ozs.; while the chief decreases were: Simmer and Jack, 885 ozs.; Witwatersrand, 648 ozs.; Ferreira Deep, 598 ozs.; and Rose Deep, 584 ozs.

Native Labour.

The native labour totals for the past three months are:—

	May.	June.	July.
On gold mines	170,595	168,152	166,999
On coal mines	14,510	14,704	14,688
On diamond mines	1,302	1,317	1,246

Individual Returns.

	Inc. Ozs.	Dec. Ozs.
Aurora West	—	14
Brakpan	938	–
City Deep	—	550
Cons. Langlaagte	109	
Cons. Main Reef	794	
Crown Mines	4,762	—
Durban Deep	253	—
E.R.P.M.	1,218	..
Ferreira Deep	—	598
Geduld Prop.	841	—
Geldenhuis	901	—
Government Areas	1,645	—
Knight Central	—	55
Langlaagte Estate	220	—
Luipaardsvlei	599	—
Meyer and Charlton	—	52
Modder B	491	—
Modder Deep	94	—
Modder East	419	—
New Goch	—	74
New Kleinfontein	—	52
New Modder	351	—
New Primrose	247	—
New Unified	—	119
Nourse Mines	—	60
Randfontein	177	—
Robinson	—	222
Robinson Deep	355	—
Roodepoort U.M.R.	65	—
Rose Deep	—	584
Simmer and Jack	--	885
Springs Mines	—	234
Van Ryn Estate	—	266
Van Ryn Deep	—	474
Village Deep	900	—
West Rand Cons.	—	253
Witwatersrand	—	648
Wit. Deep	—	385
Wolhuter	436	—
Miscellaneous	—	248

Outside Districts.

Sub Nigel	—	237
Transvaal G.M. Estates	277	—
Glynns Lydenburg	—	120
Miscellaneous	1,053	—

Group Profits.

	May.	June.	July.
Central Mining	£392,456	£427,557	£518,252
Barnato	250,900	281,801	331,703
Gold Fields	34,855	38,035	45,173
General Mining	36,174	40,518	44,440
Mines Selection	76,707	76,925	89,922
Union Corporation... ...	99,118	106,642	120,660
Totals	£890,210	£971,478	£1,150,150

UNION CORPORATION GROUP.

Company.	Stamps.	Tons Crushed.	Fine Ozs.	Total Revenue.
Geduld Proprietary ...	100	45,300	15,655	£88,192
Modder Deep Levels ...	70	42,500	83,978	133,854
Totals	170	87,800	39,633	£222,046

Company.	Costs Total.	Costs Per Ton.	Profits Total.
Geduld Proprietary ...	£54,220	23/11	£23,972
Modder Deep Levels ...	47,166	22/ 2	86,688
Totals	£101,396	23/ 1	£120,660

Note.—Gold value at £5 12s. 6d. per fine oz. Realisation charges in excess of normal are debited direct to revenue

GLYNN'S LYDENBURG.

The following are the particulars of the output for the month of July, 1921, in respect of the above company:—Tons crushed, 3,630; yielding (fine ozs.), 1,242; estimated value of month's output, £7,153; estimated profit for month, £1,480. The month's results are based on value of gold of £5 11s. net per fine oz.

WIT. DEEP JULY RESULTS.

The estimate of results at the Wit. Deep for the month of July, 1921, is as under: Tons milled, 31,759; gold recovered, 9,178·173 ozs.; average of stamps running, 180; stamps running time, 21·920 days; tube mills, 5; development footage, 630. The working expenditure, including head office charges, for the month is £43,411, or 27s. 4d. per ton. The estimated working revenue, based on an estimate of £5 12s. 6d. per fine oz. (less 1s. 3d. realisation charges), is £51,096, or 32s. 2d. per ton. The estimated working profit is £7,685, or 4s. 10d. per ton, from which is to be deducted the capital expenditure for the month of £1,796, leaving a surplus of £5,889.

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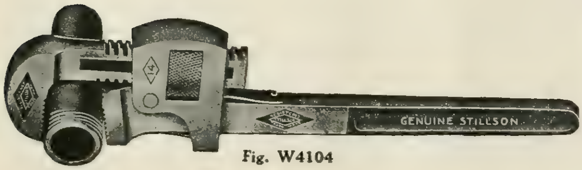

Fig. W4104

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EDITORIAL.

THE WAGE SETTLEMENT.

After many months of patient and wearying negotiation a settlement of the wage question has been announced between the Chamber of Mines and the men's unions. All concerned are to be congratulated on the result, and it may be hoped that the industry may now be allowed a period of rest from labour troubles in which to settle down to the stern business of obtaining maximum efficiency. The protracted nature of the discussions of the past few months between employers and employed will not have been endured in vain if it results in the realisation by the representatives of the men that something more than a comparatively small reduction in wages is necessary if the industry is not to be seriously curtailed in the near future. The fluctuations, mostly downward, of the gold premium in the past week have afforded a timely reminder of the ephemeral character of that mainstay of the industry to-day; and with great world movements, such as disarmament, under discussion, there is no knowing when or how soon the exchanges may not again operate to reduce substantially the returns from that source. The only healthy and permanent form of relief that the mining industry can and must strive for lies in the direction of greater efficiency of the white and black labour force. Fortunately, there are signs that recognition of this fact is now permeating all ranks of the industry, and that we are on the eve of an era of intensive effort to secure more and better work on the mines. For proof we may cite the promises publicly given by the Union leaders that they will second the aims and endeavours of the employers in this direction, and the tardy relaxation of the mining regulations. recently gazetted, whereby the mine native is permitted to put forth increased effort. These, we hope and trust, are but the signs and beginnings of a new era of economic freedom for the industry in what it will be allowed to work out its salvation untrammelled by Government red tape, Trade Union "ca-cannyism," and other stupid and artificial brakes upon progress.

ENGINEERS AND ECONOMIC PROBLEMS.

Something of an innovation marked the inaugural address of Mr. R. C. Atkinson, the new President of the South African Institution of Engineers, on Wednesday night. What Mr. Bernard Price well described as a most inspiring paper was, contrary to custom, devoted less to engineering than to the economics of industry, and certainly did not lose in general interest and value thereby. The President of the Chamber of Mines is fond of referring to the Scientific and Technical Societies Club as a place where are held discussions "which we all admire so much and understand so little," but he would have rejoiced exceedingly at Mr. Atkinson's address, which was as admirable in delivery as direct and forcible in substance and appeal. Mr. Atkinson wants the engineers of the Rand to take a greater interest in the economics of the industry. Indeed he goes further and urges the whole body of white workers in the industry to study the subject, and from that study, he is satisfied, nothing but good can result. Taking the report of the Low Grade Mines Commission as his text, Mr. Atkinson plumps for the removal of the colour bar in industry, and he declares his strong conviction that the white man himself stands to benefit mainly and ultimately from the adoption of this measure of industrial justice. Less controversial portions of the address dealt with and described the excellent housing accommodation of the natives on the mines and the extraordinary success attained by the Sanitation Department of the Corner House in reducing native mortality on the Rand. Certainly the results achieved by that comparatively young organisation have already amply justified its existence. In this connection the President paid a graceful tribute to the magnificent work of the S.A. Institute of Medical Research—a photograph of which forms our frontispiece this week. Passing to a consideration of the housing of the white employees on the mines, Mr. Atkinson showed that to attract and keep good men the gold mines to-day had to face enormous capital expenditure—in the case of a new mine distant from an existing township, running up to nearly £500,000. Shareholders are apt to forget this little item of what is almost unreproductive expenditure. Mr. Atkinson had also some remarks of interest and real practical value to make regarding the purchase and re-conditioning of second-hand mining plant, and his views were plainly the outcome of recent and none too happy experience. He also hinted at some of the results that were being arrived at from the official investigations now being made on behalf of the industry into the actual running of rock drills underground. Drilling has been found, for instance, to be the heaviest item of underground costs, averaging no less than 20 per cent. of the whole, with shovelling and tramming second at fifteen per cent. As these important trials are not yet complete, Mr. Atkinson could only promise that the final results would be published during his year of office. And if the papers and discussions of the Institution of Engineers are maintained at the high standard set by the new President's address—of which we have given but the barest outline here—their importance and value to the mining industry promise indeed to be quite exceptional.

THE DIAMOND OUTLOOK.

This week's cables report renewed buying of diamond shares from Paris, and there are local rumours to the effect that there have lately been transactions in parcels of diamonds. In well-informed quarters, moreover, the outlook is regarded more hopefully, though reluctance is still manifested by responsible authorities to publish their views. At the New Jagersfontein annual meeting held the other day at Kimberley, however, Sir David Harris did not hesitate to express his opinions, and the important position he fills in the diamond industry obviously invests with authority and importance what he has to say. In the course of a long speech Sir David declared that since the end of last November the selling syndicate had not sold any diamonds worth mentioning. "Until the diamonds thrown on the market by the Soviet Government are absorbed we cannot look forward to any material revival," he said. "It is now nine months since the demand for South African diamonds ceased," he continued; "and I am hoping that we will see a gradual recovery during the first quarter of 1922. . . . Five months have to pass before the end of the present year, and I do not think we are unduly optimistic in anticipating such a revival of the diamond market within that period as will make it unnecessary to take the painful step of again decreasing mining expenditure." Later on in another passage Sir David said: "We continue our present operations till the end of the year, by which time we hope, after thirteen months of severe depression, the market will show some signs of renewed life and activity." This public statement, coming from such an authoritative quarter, certainly provides a ray of hope for the hard-pressed digger and the great army of people who live, directly or indirectly, on the diamond mining industry. On the same occasion Sir David Harris made an interesting reference to the cause of the present diamond slump, which merits being put on record. The fall in the diamond trade, he showed, came suddenly and unexpectedly. They never anticipated that such a serious set-back could again overtake the industry. True, such an unfortunate event had happened before—in 1907-8, during the American financial crisis, and at the beginning of the Great War; but in November, 1920, none of the conditions that were responsible for any previous stagnation were existent. The War had ended in 1918, America had prospered, and they had every reason to look forward to normal times. But unfortunately a new and serious factor made its appearance in the shape of large quantities of brilliants (cut diamonds) being thrown on the market. Continental families, who before the War were substantial purchasers, were compelled to realise their jewels owing to straitened circumstances brought about by the Russian revolution and the world's conditions generally. But the most serious factor was the large quantity of precious stones from Russia offered in all the markets of Europe and America at prices far below the rates ruling during the first half of 1920. In defending the policy of the selling syndicate and the producers in not attempting to force sales on an unwilling market, which would have created a panic, Sir David said: "The policy adopted by the four big producers and the syndicate has saved the situation, given confidence to the whole trade, and will tend to bring about an early recovery instead of a protracted and serious stagnation, which misfortune would have been inevitable if the market had been flooded with diamonds from South Africa." For the sake of the industry and the country, we can only hope that Sir David's prophecy of "an early recovery" will be realised.

Notes & News.

Messina New Plant.

The new oil flotation process has now been installed at the Messina Mine and has been given an experimental run preparatory to restarting on a big scale. It is estimated that the mine has many years' ore supplies in sight. With a better price for copper the prospects of the mine are bound to improve.

* * * *

Geduld and Modder Deep Development.

The development results shown in the latest quarterly reports by the Geduld and Modder Deep Mines are eminently satisfactory. At Geduld, of 2,745 feet sampled, 1,105 feet were payable, having an average essay value of 21.3 dwts. over 34 inches. At the Modder Deep, of a total of 895 feet sampled, 760 were payable, having an average assay value of 17.6 dwts. over 48 inches.

* * * *

German Mines and Nationalisation.

The nationalisation of mines does not appear to have met with very great success in Germany. A report issued by the Mining Department of the Association of German Industries shows that the output per man in privately-owned mines is 10 per cent. greater than the output of the State-owned mines. It is stated that before the War the German State mines never did so well as the private mines, either in wages paid, in safety, in output, or in financial results; whilst the placing of the mines under a form of joint or democratic control since the establishment of the Republic has not yielded any better results.

* * * *

The Sheba Mine.

The report of Sheba Gold Mining Company for 1920 states that on the Zwartkopje section 1,301 feet of driving, cross-cutting, sinking and raising has been done during 16 months ended 30th April last, with the result that 13,500 tons of 10.5 dwts. ore have been added to ore reserves. Re-sampling of the Intombi has proved that if worked over a narrower width than previously ore of higher value can be extracted, and it is estimated that in this section 20,000 tons of 10 dwts. are available for stoping. Total estimated ore reserves of a payable nature at 30th April last amounted to 44,785 tons, average value 9.9 dwts., in addition to which there is a further tonnage of 15,200 tons of 6 dwts. ore.

* * * *

The World's Tin.

Fifteen years ago Malaya produced more than 60 per cent. of the world's tin; to-day the figure stands at less than 40 per cent., according to the *Far Eastern Review*. In 1903 Bolivia was credited with under 10,000 tons; to-day that country is the second largest tin-producing country of the world; official estimates give it 20 to 25 per cent. of the total output. Nigeria, whose output 10 years ago was practically negligible, is returned in official statistics as producing in 1917 nearly 10,000 tons. The Malayan production in 1919 is given as 36,867 tons, compared with 50,000 tons five years before. The loss on Negri Sembilan output is more than offset by the gain in Pahang, while the loss on Selangor is easily cared for by the gain in Perak. Although the percentage comparison of Malayan output with the world's total has fallen, owing to greater production elsewhere, the actual output has considerably increased. Production has been affected by years of war restrictions and hindrances; present figures do not indicate the real strength of Malayan ore production; there is good ground for urging that the industry should be taken more carefully into consideration. At present there is one large and well-known American mining company (Yukon Gold) in the Federated Malay States. This firm is importing large quantities of material and sending out capable men as prospectors. As a result, many of the local mining corporations are taking a keener interest in scientific mining.

The Gold Premium in Rhodesia.

Rhodesian gold producers, like those of the Rand, have put the sale of their gold to the best advantage in the hands of Messrs. Rothschild & Sons, of London. Advice was received from the London Office of the B.S.A. Company, dated 16th July, that Messrs. Rothschild & Sons distributed on that date the sum of £1 0s. 11d. per fine ounce, profit on gold realised during the quarter ended 30th June, 1921. The price of gold on that date was £5 13s. 2d. per fine ounce. The following are the premiums distributed by the Rhodesian gold mines to date, viz:—

	Per fine ounce.
July 25 to December 31, 1919	£0 17 0
January 1 to March 31, 1920	1 9 8½
April 1 to June 30, 1920	1 0 9
July 1 to September 30, 1920	1 7 1
October 1 to December 31, 1920	1 13 5¾
January 1 to March 31, 1921	1 2 5
April 1 to June 30, 1921	1 0 11

* * * *

The American Business Outlook.

The business outlook in the United States concerns us so much in South Africa that the following extract from a cable received by the National Bank of South Africa Ltd. from their New York office is of interest:—" Business recovery is slow and unemployment increasing. It is reported that the new prices recently announced for steel products have already been cut by the independent companies. A favourable influence which will, in time, bring about a revival is the gradual accumulation of banking resources, and the manner in which the United States system of Federal banks has withstood the period of readjustment without numerous large failures is an outstanding feature to inspire confidence. General buying continues on a hand to mouth basis, and it is predicted that this will continue for some time, which will make for a long period of dullness. The more protracted this period the more thorough will be the preparation when conditions right themselves. The most hopeful sign recently is the announcement that Government officials are formulating a plan whereby the railroads will receive approximately five hundred million dollars additional Treasury advances during the next six months

* * * *

The Far West Rand.

Mr. W. P. Taylor writes:—" Having been asked by readers of my articles on the Far West Rand what I think is the first step towards proving payable gold to exist between the Western Rand Estates and the mines that show payable values in the Potchefstroom district, my answer is—First, that an inquiry into the reasons for the mines on the line not being worked all these years should be immediately made; that the Mining Department should demand full information of all developments and reports on these mines, and render every advice and assistance to get them started again. Secondly, that as there is great reason to believe that the reef cut by the Western Rand Estates continues west or south-west from that property, that the Department follow the precedent of Australia and other countries and offer £1 for £1 up to £100,000 to prove the line by boring. To-day, with shot drills, these holes can be completed very rapidly, the principal formation to be pierced being dolomite, which is easy rock to bore in. I have no doubt but that with such an offer syndicates will be formed to take up the area and find the first £1 required; in fact, I believe there is already a syndicate in existence which would be ready to start at once. In making such a suggestion I am only asking an adoption of what individuals can demand in Australia. It is not uncommon for the Government of this country to advance money to farmers, to undertake irrigation works, and to assist industrial concerns. Here is the premier industry of this country held up by mine owners and apathy. It wants attention, immediate attention, and energetic action, for what I call for as an individual, the people of this country will demand with every insistence when they once realise the position."

The Trade Outlook.

Surveying the past year's trade in Capetown in the Chamber of Commerce annual report, Mr. Vere-Hodge, chief clerk, Statistics Branch of the Customs Department, refers to 1920 as a tidal wave year, reversing the relative positions of imports and exports, and without any counterpart in the past. He records: " It is very improbable that the more prominent of its peculiar characteristics will repeat themselves in the future." Having discussed the unwelcome situation during the latter half of the year, for which the very prosperity was largely responsible, the writer is of opinion that the decline will continue for some months, after which there will eventuate a revival of trade on a more stable basis. He concludes optimistically on the broad view: "There is everything to justify a confident belief that this young country—young, that is, in nationhood—with its favoured clime, its almost inexhaustible mineral and agricultural resources and its virile people, is destined to hold one day a leading place in the intercourse and solidarity of nations. South Africa has been piloted safely through a troublous sea, and though the storm has not abated, it still runs strongly before a favourable wind and with flying colours into the vast ocean of unexplored possibilities."

* * * *

Industrial Progress.

Evidence of industrial progress in South Africa was quoted in the presidential address at the Convention of the S.A. Federated Chamber of Industries, recently held at Port Elizabeth. Referring to the first industrial census of the Union, taken in 1916, the President pointed out that manufactured products then totalled in value £40,000,000, whilst the latest figures available showed an annual production of £71,000,000. During the War 2,000 factories were established in addition to those already in existence. To-day there were 6,000 factories in the Union, employing 143,000 hands and paying £14,500,000 annually in wages. These factories, including site, plant and machinery, represented invested capital to the value of over £37,000,000. The materials consumed annually reached £41,000,000, of which 53 per cent. was material wholly of South African origin. The value added to these materials by labour and process of manufacture resulting in the finished product amounts to £30,000,000 per annum. Of the gross value of output of £71,000,000, 38 per cent. represented food and drink, an indication of agricultural raw material resources. This section had made vast strides recently. In 1915-16 the production amounted to roughly £15,000,000; to-day it had reached £27,000,000. Many of those items which a few years ago bulked so largely in trade import returns were to-day being supplied solely from local factories.

* * * *

Ex-Enemy Shares for Sale.

The Custodian of Enemy Property announces that in terms of existing legislation, the undermentioned estate and industrial shares are for sale, and tenders in writing for their purchase will be received by the Custodian of Enemy Property, Pretoria, on or before Friday, 2nd September, 1921. The names of the companies and number of shares are as follow:—Aegis Assurance Trust Company, 200; Aegis Building Co., Ltd., 100; Brick and Potteries Co., Ltd., 2,291; Bloemfontein Board of Executors and Trust Co., 30; Bell's Transvaal, Ltd., 175; Coffee, Tea and Chocolate Co., Ltd., 750; Gariep Estates and Development Co., Ltd., 3,467; Guardian Assurance and Trust Co., of Port Elizabeth, 775; Grand National Buildings, Ltd., 50; Johannesburg Estate Co., Ltd., 17,480; Kaffrarian Steam Mills Co., Ltd., 8,023; Kempton Park Estates, Ltd., 11; Moseley Buildings, Ltd., 300; Midland Agency and Trust Co., Ltd., 105; National Bank of South Africa, Ltd., 1,000; Pretoria Portland Cement Co., Ltd., 1,680; Port Elizabeth Assurance and Trust Co., 17,590; Portland House Estate Co., Ltd., 500; Premier Whaling Co., Ltd., 1,500; South African Real Estate Trust, 3,376; South African Milling Co., Ltd., 6,659; Steytler's Buildings, Ltd., 25; United Building Society, 4; Union Steel Corporation, Ltd., 100; Vereeniging Estates, Ltd., 10,649; Van de Sandt de Villiers Printing Co., Ltd., 250; Zwartkop Saltpan Co., Ltd., 3,415.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Engineering.

Exhaust Steam: Its Employment for Power Heating, etc.—The Iron and Steel Trades Review, July 8, p. 38.

Railway Electrification.—The Electrical Review, July 8, p. 57.

The Economic Limits of Distribution from Coal-fired Stations.—The Electrical Review, July 15, p. 97.

The Thermal Efficiency of Heat Power Plant.—The Electrical Review, July 15, p. 99.

Timber Piling in Waters Infected by Marine Borers.—The Engineer, July 15, p. 57.

The Engineering Conferences.—The Engineer, July 15, p. 59.

Coal and Fuel.

Grading and Classification of Coal.—The Iron and Steel Trades Review, July 8, p. 36.

How Trolley Carrier Plan Operates: II.—Coal Trade Journal, July 6, p. 793.

Proposed Methods of Working a Highly Inclined Thick Seam of Coal.—The Colliery Guardian, July 15, p. 167

Spontaneous Combustion of Coal in Mines.—The Colliery Guardian, July 15, p. 171.

The Carbonisation of Sun Coals.—The Colliery Guardian, July 15, p. 165.

Mining and Metallurgy

Electrostatic Gas Cleaning.—The Engineer, July 15, p. 75.

The Testing of Castings.—The Engineer, July 15, p. 70.

Influence of Metallurgic Methods on Gold Production.—Mining and Scientific Press, July 2, p. 3.

Sampling of Bullion.—Mining and Scientific Press, July 2, p. 30.

Effect of Overstrain on the Elastic Properties of Steel.—The Iron and Coal Trades Review, July 15, p. 73.

Economics.

The Coal Settlement and the Future.—The Iron and Coal Trades Review, July 8, p. 48.

Wage Rates under the Coal Settlement.—The Iron and Coal Trades Review, July 8, p. 56.

Industrial Morale.—Mining and Scientific Press, July 2, p. 27.

German Competition and the Depreciated Mark.—The Iron and Coal Trades Review, July 15, p. 79.

RAND WATER BOARD.

NOTICE NO. 86.

VAAL RIVER SCHEME—CONTRACT NO. 202.

SUPPLY, DELIVERY AND ERECTION OF FILTRATION PLANT AT VEREENIGING PUMPING STATION.

IT IS HEREBY NOTIFIED that the date on or before which tenders in respect of the abovementioned contract are to be deposited at the Board's Offices HAS BEEN EXTENDED from 12 o'clock noon on the 9th September, 1921, to 12 O'CLOCK NOON on FRIDAY, the 23rd SEPTEMBER, 1921.

W. INGHAM, M.Inst.C.E., M.I.Mech.E.,
Chief Engineer

Johannesburg, 11th August, 1921.

Concerning Mines and Men.

Sir Lionel Phillips has sailed for South Africa.

* * * *

Mr. Harry Grauman sails for England this week on business.

* * * *

Mr. Owen Letcher having sailed for India this week, Mr. S. R. Potter remains in editorial control of this paper.

* * * *

Mr. R. A. Barry, general manager of the T.G.M.E., has left on a six months' leave. His place will be taken by Mr. G. N. Normand, the assistant general manager.

* * * *

We much regret to record the death this week of Mr. Simon Sacke, a pioneer of the Rand, and a former director of gold mining and other companies. Mr. Sacke was 72 years of age, and one of the best known and highly respected members of the community.

* * * *

Mr. A. W. Jones has been appointed to the vacant post of Principal of the Johannesburg Trades School. Mr. Jones, who hails from Cardiff, and is a graduate of that university, has been with De Beers at Kimberley for the past 18 years. At the time of his new appointment he was assistant chief draftsman and chief lecturer in mechanical engineering at the Kimberley School of Mines. Mr. Jones took up his new duties last week.

Sub Nigel Development.

The directors of the Sub Nigel, Ltd., report that the estimated net profit for the quarter ended June 30 is £14,289 9s. 5d., and the company's gold reserve is 2,330 fine ounces. The amount spent on capital account during the period was £18,995 19s. 6d. The profit for the quarter allows for a deduction of £665 12s. 5d., which represents the amount by which the estimated realisations, as contained in the monthly reports for the previous quarter, have exceeded the receipts on account of premium up to and including the settlement at March 31, 1921.

The increased development footage accomplished during the quarter, practically the whole of which was charged to working costs, was the principal factor in the increased cost of working. The effect of this was, however, offset by a considerably improved recovery per ton. Expenditure on renewals exceeded last quarter's expenditure by £4,500.

As regards development, 2,850 feet were advanced, 1,635 feet were sampled, and 20 per cent. of the footage sampled showed payable values. These values appeared almost entirely in the "C" shaft area. The drive eastwards on the 16th level in the "B" shaft area, which the company is advancing under arrangement with the Nigel Gold Mining Company was advanced a further 380 feet, and has passed through 60 feet of good values.

The average number of natives employed was 1,303, as compared with 1,185 for the previous quarter.

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The Week in the Sharemarket.

IRREGULAR—GOVERNMENT AND EX-ENEMY SHARES—WAGE SETTLEMENT—GOLD PREMIUM FALLING?

The week opened cheerfully on the news of the wage settlement and most gold stocks improved. The July output figures were also a good factor; and other things being equal, the prospects of improved dividends for the current half-year are regarded as much better. The native labour supply to the mines has fallen off further on the month, but this is a seasonal condition. Another hopeful feature is the news that General Smuts and Sir Lionel Phillips are on their way back to South Africa on the same boat, and that a firm offer will be made to the Prime Minister as soon as he returns for the ex-enemy shareholdings. This, as the London papers say, is the sole remaining unfavourable factor in the South African market, and its removal may make for a revival of interest in our market generally. Diamonds are a trifle better, reflecting the slightly improved news from overseas. The Minister of Mines, who has been visiting the Rand this week, has been looking into the position of both the gold and diamond industries, and is said to be satisfied with the prospects of a revival in the latter. Sir David Harris at Kimberley has also been expressing optimistic views, and the end of the year is expected to see a turn for the better. Apart from gold and diamonds, the market remains featureless, Transvaal silvers excepted. The latter fell sharply early in the week, but have since begun to recover. Tin and colliery shares remain quiet. The week's quotations are as follows: -

	Fri. 5th.	Sat. 6th.	Mon. 8th.	Tues. 9th.	Wed. 10th.	Thur. 11th.
Anglo-Amer. Corp.	21 6	22 0	22 6	22 6	22 0	22 6
Bantjes Cons.	4 9*	4 9*	4 9*	4 11	4 9*	4 11
Brakpan Mines	51 0*	52 0	51 6*	53 0	52 6*	—
Bushveld Tins	0 6*	0 6*	0 6*	0 6*	0 6*	0 6*
City and Suburban.	2 0*	2 0*	2 0*	2 3*	-	2 3*
City Deeps	49 0*	48 6*	49 0	49 0	48 6*	48 0*
Con. Diamonds	16 0*	16 3	17 3	16 9	16 6	17 3*
Con Investments	22 0*	23 0*	23 6*	—	—	—
Con. Langlaagtes	12 3*	12 6*	13 0*	13 0*	13 6*	13 6*
Con. Main Reefs	10 3*	10 4*	10 0*	10 4*	10 6	10 6
Con. Mines Select.	—	—	—	—	15 6†	—
Coronation Colls.	—	-	—	40 0*	-	—
Do. Freeholds	1 0†	—	1 0†	0 9*	0 9*	0 9*
Do. Syndicates	5 6	—	—	5 0	—	5 3*
Crown Diamonds	3 1	3 3	3 0*	3 1*	3 2*	3 3*
Crown Mines	39 6*	40 0*	41 0*	41 0*	40 6*	40 0*
Daggafontein Mines	3 3	3 0*	3 0*	3 1*	3 6†	3 1*
East Rand Coals	2 1*	—	2 0*	2 1*	2 0*	2 1*
East Rand Deeps	—	—	0 6*	0 9†	—	—
E.R. Minings	8 0*	—	—	8 6*	8 6*	8 0*
East Rand Props.	5 0	5 9b	5 10	5 6a	5 6*	5 0*
Frank Smith Dmds.	3 8*	3 8*	3 8*	3 8*	3 9	3 9*
Geduld Props.	49 3*	49 6	50 0	49 6*	49 0*	49 0*
Glencoe Colls.	14 6†	14 6†	14 6†	—	14 0	—
Glynn's Lydenburgs.	5 0*	5 0*	—	—	5 6*	—
Govt. Areas	78 6*	78 9*	79 9	81 0	80 6	81 0*
Hume Pipes	17 0†	17 0†	17 0†	17 0†	17 0†	17 0†
Jupiters	—	1 0*	1 9†	1 9†	—	—
Knight Centrals	4 1*	4 1*	4 2	4 1*	4 0*	4 0*
Lace Props.	—	—	6 9*	7 0*	—	6 9*
Leeuwpoort Tins	10 0*	10 1*	10 0*	9 9*	9 6*	9 9*
Luipaardsvlei Est.	—	—	1 3*	—	1 6*	1 6*
Lydenburg Farms	5 6*	5 6*	5 9*	5 9*	—	5 6*
Middelvlei Est.	1 0	1 6	—	—	1 6	—
Modder B.'s	28 0	28 6	28 9	28 9	28 3*	29 3
Modder Deep	43 3*	44 3	44 3	44 9	44 3	44 3
Modder Easts	12 0	11 10*	11 6	11 6*	11 3	10 6
Natal Navig. Colls.	—	33 0*	34 6	35 0†	35 0†	34 6†
New Eland Dmds.	21 0*	22 0*	24 0†	22 0*	22 0	22 6*
New Era Cons.	7 4*	7 5*	7 5*	7 0*	—	—
New Geduld Deeps	1 4*	1 4*	—	1 4*	—	1 4*
New Kleinfonteins.	—	6 0*	5 9*	6 0*	6 0	5 11*
New Modderfontn.	68 6*	69 0	69 6	70 0	69 6	70 0
New Unifieds	3 6	—	—	4 0†	—	3 0*
New States Areas	23 0	23 6*	24 0*	25 0b	24 6	24 0*
Nigels	4 3*	4 3*	4 6*	5 0*	—	—
Nourse Mines	7 3*	7 6	7 9*	8 6	8 10½	8 6*
Pretoria Cements	49 0†	48 0*	48 6*	48 0	48 0†	48 0a
Princess Estates	—	—	—	—	—	0 10*
Rand Collieries	1 0*	1 0*	0 10*	—	0 10*	0 10*
Rand Nucleus	—	1 0*	1 1†	—	1 0*	—
Rand Select. Corp.	45 0*	—	—	—	—	—
Randfontein Cent.	10 9*	10 9*	10 9*	11 0*	11 3	10 9*
Randfontein Est.	17 3*	17 4*	17 9	17 4½	17 0	17 3
Roberts Victors	8 0	8 0*	8 0*	—	—	8 0*
Rooibergs	4 0*	4 3*	4 3*	4 0*	4 0*	4 0*
Rouxville Dias.	1 6*	1 9	1 9*	2 0†	1 9*	1 9
S. A. Lands	4 1*	4 3*	4 3*	4 3*	4 3*	4 3*
S.A. Townships	10 10*	10 9*	10 9*	11 0	10 9	10 6*
S.A. Alkali	15 9	16 3*	16 9*	16 6*	16 3*	16 0*
South. Van Ryns.	—	3 0†	—	2 6*	2 3*	2 3*
Springs Mines	38 7	38 10*	39 6	39 6	38 9	39 6
Sub Nigels	11 6	11 6	11 6*	11 4	11 3*	11 3*
Swaziland Tins	—	10 0†	10 0†	10 0†	9 0	10 0†
Transvaal Lands	—	17 0*	17 3*	17 3*	17 0*	17 9†
Trans. G.M. Est.	—	—	8 6*		—	8 6*
Transvaal Silver	22 6	22 9*	23 3	21 0	21 3	23 0
Union 5 per cent.	£98¾	£98¾	£98¼*	£98½	£98½	£98.
Van Ryn Deeps	68 9	69 0	69 6	70 0	70 0a	70 6*
Village Deeps	—	7 9*	8 9	8 9*	8 9*	9 0*
West Rand Cons.	—	2 6†	2 6†	2 6†	2 6†	2 6†
Western Rand Ests.	4 0*	4 3*	4 3*	4 0*	4 3	4 1*
West Springs	12 3*	12 6*	12 9	12 6	12 6	12 7*
Witbank Collieries	44 0*	—	44 0*	44 0*	—	—
Witwatersrands	—	—	—	—	10 6	10 6
Wit. Deeps	7 3*	7 3*	7 6*	—	8 0†	6 9*
Wolhuters	3 10*	3 9*	4 0	3 9*	4 0*	4 0*
Zaaiplaats Tins	3 6	3 9	3 6	3 9*	3 7*	4 0†

* Buyers. † Sellers. a. Odd lots. b. Ex London.

Consolidated Oils.

The shares of this venture were introduced on the market this week at a premium. The shares are of the denomination of 1/- each, and the enterprise has absorbed the old Somerset Syndicate which owned a property 12 miles from Christiana in the Boshoff district

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South-West Protectorate Diamonds and Taxation.

The closing of Luderitzbucht diamond fields has led to a revival of Press agitation in the South-West Protectorate. "Algemeine Zeitung" (Windhoek) asks what has become of the general mandate condition that circumstances of the mandated territories must be improved. "One flourishing town after another," it says, "built by German energy, is going down—first Karibib, then Swakopmund, and now Luderitzbucht. Moreover, owing to the absence of diamond taxes every white man will have to bear a taxation of £85 per head per year. This will mean that numbers of artisans and others will be pushed out by economic pressure, and that the territory will be artificially depopulated." The paper advocates compulsory working of the mines, according to existing legislation, especially "as South-West diamonds are better shaped and more easily saleable than Kimberley stones." It entirely ignores the collapse in the world demand for diamonds.

* * * *

The Diamond Fields of Africa (D.F.A.) Exploring Co., Ltd.

Mr. J. Dale Lace has introduced a new company with the above name on the London market. It appears that the company was registered on the 21st April, 1920, for the purpose of adopting an agreement of 12th April, 1920, made between John Dale Lace of the one part and Evlin Tyrrell Heally on behalf of the Company of the other part. 680,000 shares have been issued, of which 200,000 shares represent the subdivision of 25,000 shares of £1 each upon which 3s. 6d. per share had been paid, 400,000 shares were issued as fully paid to the Vendor.

The Company holds options upon properties totalling 33,807 morgen, about 71,500 acres, subject to payments amounting to £156 10s. per quarter. On two of these farms, named Smuts and Bowden, which are approximately in extent 3,649 morgen, equal to 7,398 acres, two Diamond Mines have been discovered and have been reported upon by Dr. H. Meensky. The Company has an option to purchase the Freehold of these two farms for £6,000 cash

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ENGINEERING SECTION.

Efficiency of Steam Boilers.

THE VALUE OF WATER CIRCULATION.

Till recent years boilers were the Cinderellas of all power plants, much time and thought were spent upon engines for economical use of steam *after* it had been produced, while little attention was paid to the boiler to see that the steam itself was produced economically. The higher cost of all fuels now forces upon the attention of steam users the necessity for using the fuels and boilers to the best advantage.

To produce high pressure steam three things are necessary: (1) A boiler; (2) fuel; (3) water.

(1) *Boilers* have advanced in types, quality and methods of manufacture, but the perfect boiler has still to be made. One that will ensure that *all the heat* in fire will be transferred to the water inside it. All steam boilers are alike in the point that their duty is to produce steam at lowest cost.

(2) *Fuel*, whether solid, liquid, or gaseous, no matter what type of boiler is used, has just one thing to do, viz., to burn itself up completely and transfer its heat to the water.

(3) *Water*. This is by no means an easy subject to deal with, although it is the most universal thing in the world, yet we really know very little about its constitution and character. But we do know a lot about its curious behaviour when we require it in the gaseous condition as steam. It may be taken as a certain fact that water does not like to be bothered by heat and compelled to burst into steam. In other words water is a bad conductor of heat and resists all but the most determined efforts to compel it to get hot. In any case it will not get hot *quickly;* it takes considerable time, even under the best conditions, to produce steam at 212°F. The old proverb " A watched pot never boils " aptly expresses this fact.

Further, if the vessel or boiler becomes very hot (even less than red hot) water positively refuses to be heated by it at that spot and curls itself up into the spheroidal state, hence beyond a certain point it is not possible to bustle heat into water. But water has one special and splendid peculiarity, viz., it stores up nearly 1,000 heat units before bursting into steam. The value of this " latent " heat is obvious.

The main point is to see how to hurry up the sluggishness of water for absorbing heat. Nature's method is to set up a series of *convection* currents immediately any heat is absorbed, thus the warmer and lighter molecules naturally rise and their place on the hot spot is taken by heavier and colder ones. This motion is automatic and very valuable even though slow. But *convection ceases* when steam is freely formed as the steam bubbles carry a far greater amount of heat than convection currents and heat the upper water more rapidly, at first themselves becoming totally condensed in doing this important duty.

It is important to note that convection and steam production are *always above, never below*, the source of heat. This explains why the parts of boilers (Lancashire, Scotch, Marine, etc.), *below* the level of the fire bars may be quite cold, although high pressure be shown on the gauge. The fact is that the upper section of the water *has been circulated* but the lower section has not.

What effect does circulation have upon the more rapid and economical absorption of heat? Everyone knows that to cool your coffee you stir (circulate) it. What happens is that fresh areas of coffee are being brought to the radiating surface of the cup and the outside air being cooler than the coffee, rapidly carries the heat away. If the outside air is circulated also by being blown, then the heat passes still more rapidly.

Translate these familiar details to boiler practice and we find that by circulating water over the heating surfaces more heat is extracted from the fire in a given time, less being carried up the chimney. First generally have a good circulation owing to pull of chimney and the need for plenty of air to effect complete combustion; what is needed is a good movement of the *water* (stirring the coffee) to obtain fine results.

A Battery of Boilers.

This good work can be done by the " Hotchkiss " Circulator which takes hot water from over the fires and distributes it amongst the lowest and coldest water in the boiler. The action is quite automatic and commences with a rise of only 10°F. in the temperature of the upper water, continuous all the time the boiler is at work, and does not cease till the boiler is *quite cold* again.

The great advantages of this are numerous; two only need now be mentioned:

(1) The boiler will expand and contract equally all over, whether at lighting up or cooling down. The value of this condition in preventing grooving and unequal strains is of the utmost importance.

(2) Steam will be raised more quickly, with perfect safety to boiler and maintained without effort. There is no drop of pressure when engines are started and *more steam is obtained per unit of fuel* throughout the whole run, because water is being constantly poured over the spots where the greatest heat is provided.

The " Hotchkiss " Circulator performs other and very important duties; it acts as a perpetual scummer and removes mud, air, oil and grease, all the time the boiler is alight, thus enabling the boiler to work with clean water, get rid of corroding air, and wipes out the danger from oil should any get into feed water. It is *the only apparatus* existing which performs all these duties automatically and continuously. All it asks of attendants is to blow out occasionally the mud, air and oil it so industriously collects night and day.

The sources of economy are from positive movement of water over heating surfaces after convection has ceased to act, whereby more heat in less time is absorbed by the water. Further, it is much more easy to make steam from clean water than dirty, so something is added to economy. As mud and silt is constantly being collected and removed, the boiler should be capable of longer runs and shorter stops, as cleaning should not be a great matter. The removal of mud prevents it setting on heating surfaces; soft mud is a greater hindrance to the transfer of heat than a hard adhering scale, and whatever mud, etc., is collected by the " Hotchkiss " and taken *out of boiler* ceases to be a cause of scale in the boiler. Where turbines and superheaters are employed, great harm may be done by scum and grease priming over with the steam; all trouble from this source ceases where the " Hotchkiss " is installed on the boilers.

Although in water tube boilers the question of circulation may not be so acute, even on this point the " Hotchkiss " can do much good, yet the troubles from scum and grease are proportionately greater, owing to the smaller water spaces, compared with the greater heating surface, so the output of any type of boiler is improved by installing the " Hotchkiss " Circulator. More than 3,000 boilers ashore and afloat have been fitted with the " Hotchkiss " Circulator. The accompanying block shows a battery of boilers.

Demonstrations of a working model with boiler shell and circulator in glass can be seen at the office of Messrs. W. S. Thom & Co., 9-10 Southern Life Buildings, Smith Street, Durban, South Africa, who would also be ready to supply any further necessary information.

NEW PATENTS.

682. David Brown, 75, Church Street West, Pretoria, Transvaal. Improvements in pumps. Date of registration, 12/7/21. P
684. The Singer Manufacturing Co., Elizabeth, County of Union, State of New Jersey, U.S.A. Driving or controlling mechanism for power operated machines. Date of registration, 14/7/21. C
685. (1) David James, 14, Percy Road, Cynonville, Pontrhydyfen, Port Talbot, Glamorganshire, Wales, and (2) Frederick Charles Phillip, 1, West Bute Street, Cardiff, Glamorganshire, Wales. Improvements in pumps. Date of registration, 14/7/21. C.
688. George Rushmore Whitehead, 88, University Place, Borough of Manhattan, New York, U.S.A. Diamond polishing machine. Date of registration, 14/7/21. C
694. (1) Phillip William Nevill, 102, Goderick Street, Perth, and (2) Herbert Soanes, 160, Adelaide Terrace, Perth, State of Western Australia. A process for the extraction of copper from its ores. Date of registration, 14/7/21. C.
700. Archie McInnes, Durban, in the Province of Natal. An improved method of manufacturing plain or reinforced concrete pipes. Date of registration, 16/7/21. C.
706. Charles Edward Meyer, P O. Box 3146, Johannesburg. Improvements in means or apparatus for classifying or concentrating pulverized ore products and the like. Date of registration, 19/7/21. C.
708. Daniel Fred Field, Durban, in the Province of Natal, An improved fuel for internal combustion engines. Date of registration, 20/7/21. C.
709. Robert Vernon Powys, Defence Headquarters, Pretoria. An improved form of fuel to be manufactured cheaply from waste coal products and the pulp of indigenous trees. Date of registration, 20/7/21.
710. Lewis Atkins, Boustred Buildings, Fox Street, Johannesburg. A process for carburetting alcohol. Date of registration, 21/7/21.
711. Victor Charles John Nightingale, 98, Glen Hurstley Road, Elsterurwick, near Melbourne, State of Victoria, Australia An improved apparatus for detecting or deterring the position of underground mineral lodes. Date of registration, 21/7/21. C.
715. Jas. Richard Armstrong-Kelly, c/o P.O. Box 3146, Johannesburg. Improvements in shovels, spades, digging forks, and the like. Date of registration, 21/7/21. P.
716. Henry Carpenter, c/o P.O. Box 3146, Johannesburg. Improvements in means for filtering the liquid fuel supply to internal combustion motor or engines. Date of registration, 21/7/21 P.
717. (1) Theodore Maurice Fast, (2) Wm Joseph O'Keeffe, (3) Richard Stanley Hills, P.O. Box 3146, Johannesburg. An improved tool or device for extracting broken studs or other similar screw threaded articles. Date of registration, 21/7/21. P.
721. Thomas Henry Bradbury, c/o Edgar Allen & Co., New Club Buildings, Johannesburg. Improvements in electrically heating rock drilling tools and the like articles. Date of registration, 22/7/21. P.
725. International General Electric Co., Inc., New York, U.S.A. Improvements in and relating to thermal protective devices for electrical apparatus. Date of registration, 26/7/21. C.
727. John Pollock Lindsay, c/o P.O. Box 3146, Johannesburg. Apparatus or means for the development of power. Date of registration, 27/7/21. P.

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Steam vs. Electric Winding.

(By W. C. Mountain.)

The subject of this paper is one in which I took considerable interest, and have already dealt with in papers read in 1906 before the Institution of Electrical Engineers, and also in the same year before the Institution of Mining Engineers, and before writing these papers I visited Germany in order to see exactly what was being done there, and what I considered the future of electric winding in this country would be.

My investigations were at that date based upon the value of coal used under the boilers—namely 1s. 6d. up to 6s. 3d. per ton, or an average price of, say, 3s. to 4s. per ton, and as the price of small coal to-day is quite fictitious, and it is difficult to say what the market price may be in the near future, any details as to costs of winding into which coal enters must necessarily be very approximate.

Whether it is economical to adopt steam or electric winding depends upon so many circumstances that it is quite impossible to lay down any hard and fast rules, for the following reasons:—

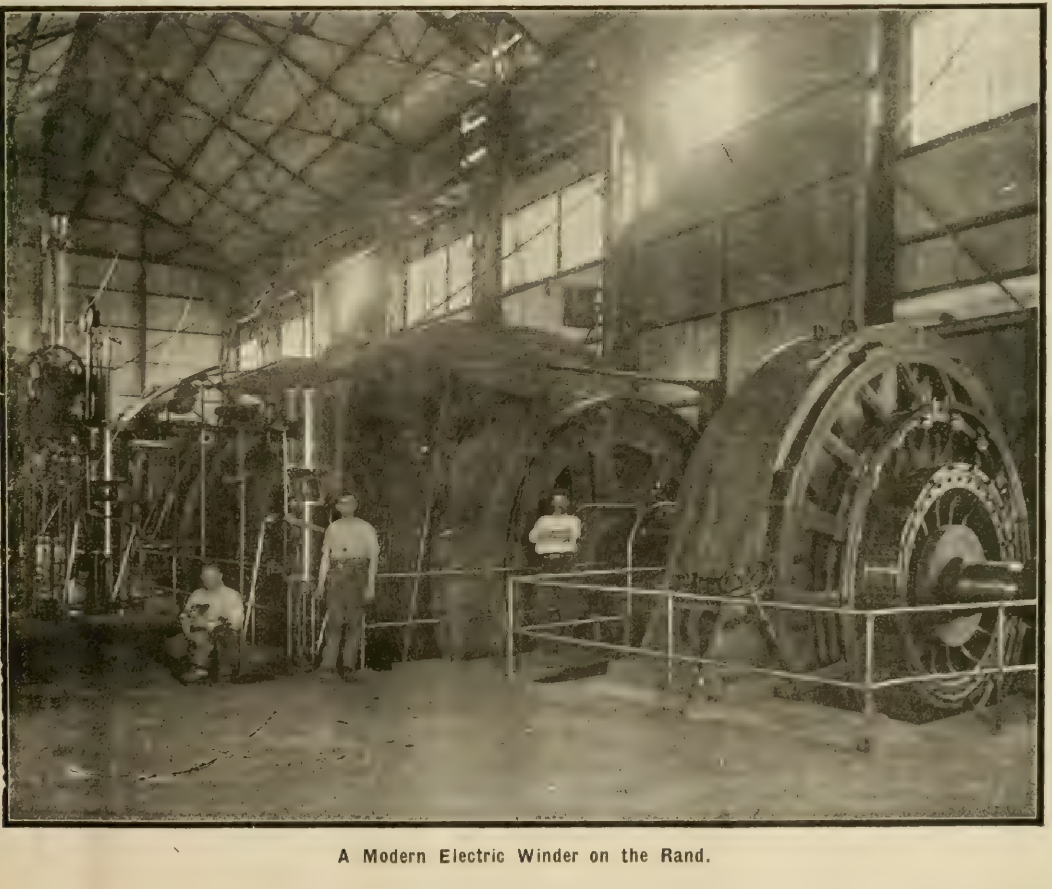
(1) If the colliery, or collieries, are so isolated that a supply of electricity cannot be obtained from the public power station, and the collieries are of large capacity, such as we have in Yorkshire, Nottinghamshire, and in South Wales, and also to some extent in Lancashire, then I think there is no doubt that the most economical method to adopt is to put down steam winding engines and to utilise the exhaust steam in mixed pressure turbo-generators.

(2) If the collieries are of moderate size, or are small collieries, and there are several of them under one or more ownerships, then it is possible, and in fact probable, that electric winding can be economically adopted, particularly if power can be obtained from a power company at a reasonable cost; but even under these circumstances the type of winder to be adopted must be carefully considered, because unless the power company has a large capacity it may be necessary to adopt electric winders with Ilgner balancers, as small direct-driven or geared winders with three-phase motors with rheostatic control may throw a peak load on the power station which would cause serious trouble.

(3) There are also collieries where they may have blast-furnace or coke oven gas available, and this could be used either in gas engines or under boilers, and there is no doubt that in simplicity and first cost the use of steam turbines, with water tube boilers using fias as fuel and properly arranged for superheaters, has advantages, and that a very high degree of economy can be obtained.

(4) On the other hand, circumstances may make it possible to utilise the gas direct in gas engines, but it all comes to a question of cost and efficiency in running, also freedom from stoppages due to breakdowns or repairs that may be necessary in daily working.

As an example of heavy winding in collieries in Derbyshire, which may be taken as typical of the heavy duty in this country, I may mention two collieries which I will



A Modern Electric Winder on the Rand.

call " A " and " B." The depths are respectively 820 yds. and 900 yds., and the total weight of coal wound per wind 9 tons 6 cwts., the further particulars in each case being as follow:—

Time of wind	60 secs.
Time of changing	12 ,,
Steam pressure at boilers	160 lb.
Diameter of steam engine cylinders ...	44 in.
Length of stroke	84 in.
Dimensions of conical drum	17-32 ft.
Estimated H.P. on 2nd revolution ...	3,960
.. .. 4th	3,680
.. .. 6th ,, ...	4,380
,, .. 7th	1,780
Steam consumption per wind exclusive of condensation in pipes, etc. ...	600 lb.
Steam consumption per shaft H.P. ...	30
Consumption of coal assuming 50 winds per hour per winding day of 13 hrs. 20 mins.	22 tons 5 cwt.
Cost of winding engines to-day approximately	£20,000

The exhaust steam from these winding engines is used in mixed pressure turbo-generators, and I am informed that in 1918 the costs per unit delivered to the bushbars in the power station were as follow:—

	Labour, steam and stores. Per kw d.	15% interest and depreciation on capital. Per kw. d.	Total cost. Per kw. d.
Exhaust steam only	0.0189 ...	0.06 ...	0.0789
Mixed pressure steam ...	0.0902 ...	0.06 ...	0.1502
High pressure steam ...	0.227 ...	0.06 ...	0.287

In the case of high pressure steam the coal to the boilers was taken at 7s. per ton.

Messrs. Robey & Co., of Lincoln, have given me further examples of large steam winding engines supplied to a South Wales colliery, with two high-pressure cylinders 31 in. diameter, two low-pressure cylinders 52 in. diameter by 72 in. stroke, with semi-conical drum 14 ft. to 22 ft. The shaft horse-power is estimated at 800, whereas the maximum indicated peake horse-power is 4,300.

Messrs. Fraser and Chalmers have also given me particulars of winding engines of the double-cylinder type, 36 in. diameter by 72 in. stroke, in which they estimate the steam consumption per shaft horse-power at 33 lb.

Also of cross compound engines with cylinders 32 in. by 53 in. by 66 in. stroke, in which they estimate the steam consumption per shaft horse-power at 33.6 lb.

These examples will show that up-to-date modern steam winders are economical as regards the consumption of steam per shaft horse-power, and it must be remembered that in utilising exhaust in exhaust steam turbines a kilowatt can be obtained for about 25 lb. of exhaust steam at 16 lb. pressure absolute delivered from the winding engines into the turbines.

Electric winding has made very substantial progress, and a great deal of heavy work of this description has been done by the British Westinghouse Co., now Messrs. Metropolitan-Vickers Electrical Co., in South Africa.

The winders are fitted with semi-conical or parallel drums in accordance with the requirements, and from information supplied to me, the motors are rated to give from 1,450 to 1,600 h.p. normally, but are capable of carrying a peak load of from 3,000 h.p. to 4,000 h.p.

A successful electric winder has been installed by Mr. Bramwell at the Great Western Collieries, South Wales.

Messrs. Siemens now the English Electric Co.) have also successfully applied electric winding to mines in South Wales, North of England, and elsewhere.

To reduce the whole matter to a simple basis I cannot do better than repeat what I stated in summing up my views in 1906, namely:—

(a) For small collieries there is a future for electric winding if the coal used under the boilers is of any considerable value.

(b) In large collieries there is a future for electric winding if the coal used under the boilers exceeds 8s. to 10s. per ton, but this, of course, depends entirely upon the relative costs of steam winders with their boilers compared with the electrical equipment.

(c) Electric winding cannot be economically applied to collieries for very large outputs where it is necessary to instal a generating plant to produce the necessary output for operating the winder, because the horse-power required for winding is so greatly in excess of the horse-power required for driving other machinery, and as it would be necessary to provide a stand-by plant, the costs would be prohibitive.

(d) In collieries generally, particularly those in which electric winding is adopted, colliery owners would be well advised to take their current from the supply companies, assuming they can purchase it at a reasonable price, even if this price is slightly in excess of the cost at which they can produce the current themselves, due to the amount of capital required for the generating plant being so heavy. The same capital expenditure could be applied to much greater advantage in increasing the electrical plant on the surfaces and underground.—Engineering Conference.

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Progress on "C.M.S." Mines.

POINTS FROM LATEST REPORTS FROM SPRINGS, BRAKPAN, AND WEST SPRINGS.

The directors' quarterly reports of the West Springs, Ltd., Brakpan Mines, Ltd., Springs Mines, Ltd., and Daggafontein Mines, Ltd., have just been issued, and the following are some of the items of interest contained therein.

In regard to

West Springs, Limited.

shaft sinking at No. 1 was completed during the quarter, a distance of 213 feet being sunk, making the final depth of the shaft 4,105 ft., fully timbered. The main station was cut, 337 feet of work on station and station roadways being accomplished. A loading station was cut 100 feet below the main station, and the cross-cut to the ore and waste bins commenced. After this cross-cut was advanced 23 feet, work on this horizon was discontinued for the time being. A temporary loading bin was installed to facilitate handling of development rock. A transformer chamber was excavated near the main station.

No. 2 shaft was sunk 350 feet, making the depth at the end of the quarter 2,940 feet, of which 2,917 feet are timbered. Reefs belonging to the Kimberley series were passed through and carefully sampled; the results were unpayable. Early in June it was decided to discontinue sinking operations, and to start a borehole from the shaft bottom in order to obtain some advance information as to the probable depth of the reef. After additional reefs belonging to the Kimberley series had been intersected, the Kimberley basement shales were located at a depth of 3,221 feet below the collar of the shaft. The erection of the new boilers has been completed, the erection of the smoke stack is proceeding, and work on the boiler house and the coal bunkers is well in hand. A 12in. air main has been installed in No. 1 shaft, and the 10in. surface air main between Nos. 1 and 2 shafts has been completed. The foundations for the compressors are making progress, and the railway has been completed to the coal bunkers at the No. 1 shaft boiler plant. A small recreation hall is now ready for use.

Of the footage sampled during the quarter, 60 feet, equivalent to 21 per cent., showed payable assays, averaging 50.50 dwts. over 11.42 inches. The east haulage encountered an upthrow fault, but a borehole has proved the extension of payable values beyond the fault. The north-east haulage has now entered into a shoot of payable ore, which may be correlated with an ore shoot previously encountered in the east haulage. The reef is of narrow width, but of high value. The 8 east haulage is the continuation of the 8 west haulage from Springs Mines, which entered the company's property. This haulage will be turned in a north-western direction, and, as it has just traversed a large shoot of payable ore in Springs Mines, it will be in close proximity to the extension of this ore body if it continues into West Springs, Limited.

In connection with

Brakpan Mines, Limited.

the linear development amounted to 5,195 feet, of which 3,457 feet were on reef, averaging 8.69 dwts. over a reef width of 36.14 inches. Of the footage on reef, 1,310 feet, equivalent to 38 per cent. of the sections sampled, were payable, and averaged 16.28 dwts. over 40.22 inches. In addition to the above footage, development work was continued from No. 4 shaft.

The estimate of the payable ore reserve as at 30th June, 1921, shows an increase of 23,108 tons over that as at 31st December, 1920, and now totals 2,549,625 tons, of an average assay value of 8.77 dwts. over an average stoping width of 70 inches.

During the quarter this shaft was sunk a further 334 feet, making the depth of the shaft at the end of June 4,530 feet, of which 4,506 feet are bricked and ringed. Towards the end of May, at 4,425 feet below the collar, bands of reef were passed through, which corresponded in appearance and position to the leaders usually found in Brakpan Mines at about 13 feet above the proper reef. At 4,437 feet a reef was intersected, but, after the shaft bottom had been advanced 18 inches, this reef was cut out by a flat-lying dyke. Owing to the incomplete reef exposure and consequent element of doubt, the consulting engineer was disinclined at that time to pronounce this the Main Reef until full confirmation was obtained by the completion of shaft sinking. The 18 inches exposed assayed 1.9 dwts. The dyke was traversed after sinking a further 11 feet, but no more reef was exposed below the dyke, the shaft entering into footwall shales. Sinking was continued in the shale in order to provide room for ore bins and sump. At 4,525 feet below the collar the loading station was commenced; the footage in connection with this work amounted to 36 feet.

At No. 4 Circular Shaft, work on station roadways was started. A temporary loading bin had been put in, the ventilation column was reconditioned, and a water service was installed prior to starting development.

The capital expenditure incurred during the quarter amounted to £42,201 16s. 6d.

The estimated premium on gold recovered during the quarter was calculated by taking the price of gold as follows:

	£	s.	d.
April—103s. 9d. per fine oz.	£21,031	18	8
May—103s. 9d. per fine oz.	21,334	9	6
June—107s. 6d. per fine oz.	23,540	6	11
	£65,906	15	1
Less—Estimated exchange premium on remittances	2,204	17	6
	£63,701	17	7

The actual premium on gold for the three months ended May 31, 1921, was £7,253 2s. 10d. in excess of the amount estimated.

Springs, Mines, Limited.

The linear development amounted to 4,474 feet, of which 3,580 feet were on reef, averaging 20.79 dwts. over a reef width of 17.88 inches. Of the footage on reef, 1,795 feet, equivalent to 50.8 per cent. of the sections sampled, were payable, and averaged 26.64 dwts. over 24.65 inches. In addition to the above footage, development work was continued from No. 3 Shaft.

The payable ore reserve as at June 30, 1921, was estimated at 3,002,981 tons, of an average value of 8.76 dwts. over an average stoping width of 62.53 inches. Compared with the estimate at December 31, 1920, the reserve shows an increase of 276,803 tons, the value remaining the same, while the width decreased by 0.95 inches.

Shareholders were informed by notice in the Press on June 16 last that, in view of the strength of the ore reserve position of the mine relative to the crushing capacity, and the indications of a considerable increase to the ore reserve as at June 30, 1921, the directors authorised the purchase of additional equipment to increase the nominal crushing capacity of the plant from 40,000 to 50,000 tons monthly. As the result of the experiments which were referred to by the consulting engineer in the last annual report, this will be accomplished by the installation of four additional tube mills.

Daggafontein Mines, Limited.

The proclamation of the farm Doornfontein No. 9 has not yet been gazetted. The purchase of 172·604 claims from The Consolidated Mines Selection Company under circumstances already reported has been completed, and the agreement in respect of 448·898 claims leased from the Government has been signed.

After proclamation, the claim area of the company will be approximately as follows:—

Mynpacht area, 1,257·785 claims; discoverers' claims, 178·999; purchased from The Consolidated Mines Selection Company, 172·604; leased from Government, 448·898—2,058·286 claims.

A tentative agreement was entered into between the Rand Water Board and the company for the purchase of the water making in the mine. As, however, it was impossible to render all the mine water potable, the agreement was not completed, and the directors had no alternative but to allow the mine to flood until such time as it is possible to raise further capital for the resumption of mining operations. Certain essential portions of the pumping plant are being left in the mine, which will facilitate the work of dewatering when pumping operations are resumed.

As shareholders have been informed, the consideration payable in respect of 172·604 claims acquired from The Consolidated Mines Selection Company was 400 shares per claim, involving an issue of 69,042 fully-paid-up shares in the company. These shares were provided by the issue of 31,967 reserve shares and the creation of 37,075 new shares. The issued capital of the company is now £1,017,075 in 1,017,075 shares of the nominal value of £1 each.

All the underground equipment was removed prior to the cessation of pumping operations, and this equipment, as well as the stores on hand, will be disposed of as opportunity offers. In view of the suspension of mining operations, and in order to reduce the company's expenditure to the lowest possible limit, the directors and The Consolidated Mines Selection Company have agreed to accept remuneration at a nominal fee. The company was assessed under the Miners' Phthisis Act, 1919, for the quarter ending July 31, 1921, at £696 5s. 11d.

South African Mine Workers Unite.

As the result of the Natal Collieries Association having amalgamated with the S.A. Mine Workers' Union and the amalgamation of the Rhodesian Mine and General Workers' Union also, every mine in South Africa and Rhodesia is now under the authority of the S.A. Mine Workers' Union so far as trade union affairs are concerned.

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Big Oil Tanks at Durban.

In last week's *Government Gazette* it was notified that the Anglo-Persian Oil Company, Ltd., fuel oil installation, Durban, had submitted for approval for the deposit of heavy fuel oils in bond, two steel tanks of approximately 2,000,000 and 15,000 imperial gallons respectively, with pipes extending to the Bluff wharf. The premises affected thereby have been declared a bonded warehouse for the free warehousing and securing of heavy fuel oils imported without payment of duty.

New Johannesburg Municipal Power Plant.

There is in course of preparation a scheme for a large new generating station, making provision for future extensions as Johannesburg grows, up to an approximate total of 54,000 k.w. of plant. This can be installed from time to time as the needs of the town necessitates the additions. In connection with these proposals, the Johannesburg Municipal Finance Committee reports that it has been asked to take steps to raise the necessary funds to equip the power station in such a manner as will give the requisite electric power to consumers who to-day are receiving an inadequate supply, and to enable the laying of feeders for the supply of suburbs at present without electric current. Machinery and plant estimated to cost £119,551 is urgently needed to equip the power station for the next two years. If this is installed, it will obviate the numerous breakdowns which have occurred recently owing to overloading, and the withdrawals of trams from the service at certain hours owing to insufficiency of power will not be necessary. The Finance Committee, therefore, recommends that the Council apply to the Administrator for authority to borrow £119,551 to meet capital expenditure on the works and undertakings specified above.

Another Provay Patent.

Demonstrations have been given at Delagoa Bay of the practical working of an automatic bottom discharge 8-ton bucket, the invention of Mr. G. Provay, the Chief Engineer of that port. The outstanding feature of this bucket is that it can be employed with an ordinary crane or be handled by means of a simple rope or chain, etc., and it operates automatically after it has been loaded and conveyed to the point at which it is to be emptied or discharged by simply lowering the bucket on to a suppport or on the dump at a point where the material is to be discharged. No extra bridle rope or man's assistance to work a trip rope is necessary to make the bucket perform this operation. This feature makes the bucket extremely well suitable to discharge coal on an anti-breakage principle, because when the bucket is lowered on the coal dump the coal contained will flow gently out of the conical bottom with no drop, and hence with no chance of breakage.

ROYAL SCHOOL OF MINES FRECHEVILLE RESEARCH FELLOWSHIPS.

The Imperial College of Science and Technology, South Kensington, London, S.W. 7, with which the Royal School of Mines is incorporated, is offering two Research Fellowships of £300 a year each, tenable for one year and possibly renewable for a second year, to aid in carrying out any investigation or research connected with Mining, Mining Geology, Metallurgy or the Technology of Oil, which in the opinion of the Selection Committee is of sufficient use or promise.

Applicants who may be associates of the Royal School of Mines or others, and preferably men with some practical experience, if resident in South Africa, should apply in writing to the Secretary of the Chemical, Metallurgical and Mining Society of South Africa, Johannesburg (from whom further particulars may be obtained), before 1st September, 1921, giving the nature of the proposed investigation, qualifications for the work and references.

It is anticipated that the Committee will make the awards by the end of November, so that the Fellowships and work may begin on 1st January, 1922. Holders will be expected to devote their whole time to the work which may be conducted at the Imperial College or in special circumstances elsewhere at the discretion of the Committee.

Review.

THE GEOLOGY OF THE BRITISH EMPIRE.

By F. R. C. Reid, M.A., Sc.D., etc.

A FEW NOTES AND EXTRACTS.

The geological knowledge of the average student of the subject and mining people in general extends only to that continent, sub-continent, province, or even district with which he is associated. The correlation of the formations outside his range of knowledge with those in his vicinity does not trouble him much. However, much useful knowledge can sometimes be gained by studying outside occurrences, and often a clue to the solution of the problems in our neighbourhood is to be found in other fields. The writer of the work under review has dealt in a very comprehensive manner with the geology of all the British possessions, and in his work one can easily follow how certain members of our South African formation are carried into the depths of Central Africa. A portion which should be of special interest to South Africans is the chapter on The Rift Valleys, from which extracts are reproduced hereunder.

The Rift Valleys.

East Africa owes its surface relief largely to fractures and subsidences or broad massive upheavals of the crust, but not to folding. No true fold mountains occur in this region, the existing elevations being due to simple uplift along the lines of fracture, or to accumulations of volcanic material, or to differential erosion. But the axial line of the African continent running from north to south nearer the eastern than the western border forms the crest of an immense though gentle undulation of the earth's crust, which has been broken longitudinally by meridonial faults.

The chief peculiarities consists in the development of horsts or block mountains and of trough-subsidences of extraordinary length, while in close connection with the systems of fractures there are widely spread volcanic phenomena. Extending northwards from Lake Nyasa (and possibly from the Urema trough in Portuguese East Africa and along the eastern border of Rhodesia, and the Lebombo mountains still further south), and reaching as far north as the Red Sea, and beyond it into Palestine and Northern Syria there is a gigantic longitudinal zone of shattering or system of parallel fractures marked by trench like depressions. These fractures are either linear or curvilinear, and several parallel members of one set usually occur together, and are specially remarkable for their persistence and trough-like depressions which they have produced between them.

The rift valleys which result from these dislocations are not simple sunken troughs between lines of faults, but are strips of country affected by several more or less parallel fractures in linear series with sunken blocks of the crust between them. These blocks have not all dropped to the same extent, nor do the troughs form continuous valleys, for in places elevation has occurred along them. The fault escarpment also on one side may persist after the opposite one has died out, and the throw of the same faults may vary along their course.

The earth movements have acted intermittently and at various times, and there is evidence that a state of quiescence has not yet been reached. Earthquakes in the Rift Valley are also common north of Lake Albert, and changes of level in the course of a few years have been observed in this region.

Two characteristic features are noticeable in these rift valleys: (1) the presence of active or recently-extinct volcanos on their floor; (2) the existence along their course of a series of great lakes, for the chief lakes of East Africa lie in them.

A Banking View of the Outlook.

At a meeting of the shareholders of the Standard Bank Mr. W. Smart (chairman), in London last week, said there was every reason to expect that the amalgamation with the African Banking Corporation would result in strength and prosperity. Another event of far-reaching importance was the passing of the Central Reserve Bank Bill, and, in consequence, the establishment of the Central Reserve Bank in South Africa. The Chairman gave a brief resume of the rapid changes which the period covered by the bank's accounts had witnessed in the trade balance between Britain and South Africa, and the difficulties those changes had created for bankers. He ventured to predict that soon conditions all over the world would become normal, and South Africa would be the first to go ahead. The chairman declared, in conclusion, that shareholders would note with satisfaction that the total cash holding as at the end of March was £10,221,000, and investments £5,266,000.

The Great Volcanoes of Ruanda, near Lake Kivu, on the borders of the Congo, Uganda, and "German" East Africa. These Volcanoes are mentioned in Dr. Reid's Work on the Geology of the British Empire.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS SLOW BUT PROMISING—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—OILS AND COLOURS—UNION'S IMPORTS AND EXPORTS, FIVE MONTHS, 1921—UNION'S RAW MATERIALS—AMERICAN TRIBUTE TO BRITAIN'S FINANCIAL GENIUS—PREMIER SMUTS' GREAT SEND-OFF.

General Position.

The volume of business transacted during the past week has been small, owing to the requirements of the mines and engineering establishments at the beginning of the month having been met. These demands are still very much below normal conditions, purchases being very restricted. Withal, now that the mine labour trouble is over, it is generally anticipated that things will shortly improve. *L'affaire est finie,* and it is only necessary to say that the universal opinion of the commercial community regarding the common-sense of the miners has not been disappointed by the event. In short, the settlement arrived at is bound to create confidence all round, and emphasises the importance of round-table conferences. Everybody seems satisfied: the principle is the kernel of the matter: the mines' saving is a mere bagatelle, but it has at the same time established the fact that reductions in miners' wages must come down in order to save the lives of our low-grade mines. In the opinion of competent judges we are now turning the corner, and although months of depression may still be before us, there are signs of improvement in commercial affairs even in this year of grace.

Iron and Steel.

Iron and steel maintain their prices fairly well, but in respect of timber the tendency is still weaker, and yet lower levels are anticipated. Rhodesia is becoming very active in our market and many transactions are being put through. One bright factor in the immediate future, apart from the enhanced premium on gold, which is of course only ephemeral, is the position of the Reserve Bank, which is showing such enormous reserves of gold against liabilities (roughly about 93 per cent.), showing that the whole tendency is towards stabilisation.

Latest quotations:—Dunswart, 29s.; Union Steel Corp., Ltd., ordinary sized rounds, flats and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 45s.; ⅜ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron, 37s. 6d.; steel, 39s. 6d.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 45s. to 57s. 6d.; ¼ in. square iron, 55s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 52s. 6d. to 59s.; channels and joists, 47s. to 48s.; shafting, ⅝ in., 10¼d.; ¾ in., 10d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d.; larger sizes, 8d.; steel plates, 1-16 in., 33s. 6d.; ⅛ in., 33s.; 3-16 in., 33s.; ¼ in., 31s. and upwards; all 100 lbs., 31s.; spring steel flats, 8½d. to 9d. per lb.; bolts and nuts, ⅜ in., 1s. to 1s. 2d. per lb.; ½ in., 65s. per 100 lbs.; ⅝ in., 62s. 6d.; ¾ in., 60s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in. and ¼ in., 8½d.; ½ in., 6½d.; ⅝ in., 6d.; ¾ in., 6d. per lb.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 50s.; ⅝ in., 50s. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 7d.; ½ in., 1s. 5d.; ⅝ in. and upwards, 1s. 4d.; brass sheets, 2s. 2d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 2d. to 2s. 4d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7d.; hollow, 10d. to 1s.; wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 57s. 6d. to 60s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d.; per 98 lb. coils; 24s. to 25s. per 68 lb. coils, large, 12 gauge, 28s. 6d. per 96 lb. coil; 14 gauge, 22s. 6d. per 66 lb. coil; plain wire, No. 8 galvanised, 35s., and black 32s. 6d. per 100 lb. coil.; fencing standards, 12, 14, and 16 lb., at 27s. 6d., 30s. and 32s. 6d. respectively per dozen; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb.; copper tubes, solid drawn, ¼ in., 3s. 9d. per lb.; ⅜ in., 2s. 11d. per lb.; 7-16 in., ½ in. and 9-16 in., 2s. 9d. per lb.; ¾ to 1⅛ in., 2s. 6d. per lb.; 1½ in. to 2 in., 2s. 3d. per lb.; 2¼ in. to 3 in., 2s. 6d. per lb.; 3½ in. to 4½ in., 2s. 8d. per lb.; copper rods, ⅜ in., 2s. 5d. per lb.; ½ in., 2s. 4d. per lb.; ⅝ in. to 2½ in., 2s. 2d. per lb.

The Mines have placed lately some fairly good orders for second-hand piping, steel plates, etc. By the closing down of several mines of late the market has been during that time well supplied with requisites for the living mines from the defunct ones. Steel plates, second-hand, have been sold during the past fortnight at from £17 10s. to £18.

Engineering Shops.

Business continues fair, but there is an optimistic feeling that things will soon return to something like normal. A partner of a prominent engineering firm stated that he had this week approached the Publicity Department of the Railways with regard to exhibiting a show case of their samples at the Park Station. He hoped later on to extend the exhibition to other stations and also to induce other makers to join him in the venture. He stated that, on the whole, he had not met with very sympathetic treatment on the part of the officials, who seemed to look uopn locally manufactured articles as not quite the thing. He represented to the railway people that he, in common with others, was competing with the manufacturers of the world, whose industries, factories and fame were established nearly 100 years ago, fostered on the semi-slave labour conditions of the period, where men slaved in those industries for as many pence as pounds are to-day paid. Those conditions cannot be tolerated to-day. In addition to all this, those industries with which we have to compete are close to the markets of the world, with the benefit of a perfect exporting advertising system; that steamship and railway companies—even our own railways—derive more direct revenue from the imported goods than from the handling of our own products. He said that with such companies as the Union-Castle Co. they would actually carry goods at cost price in many cases rather than come to South Africa with empty holds. He thought that the action of the Northampton boot manufacturers in approaching our Premier, General Smuts, in regard to the importation of boots, thoroughly bore out his case; was a case of gross impertinence, and should not have been tolerated. In many cases goods from England, he said, can be landed in Johannesburg cheaper than we can send our local goods to Bloemfontein. Many European Governments are subsidising their industries. This and many other points are those which usually the ordinary critic loses sight of; our own market, be it not forgotten, is limited; there is no export organisation, there are no Government facilities granted to exporters. Outside London, if we want to export we have to plough our own furrow. The boot is on the other leg as regards imports. The big wholesale houses are managed, he declared, by those who scarcely feel themselves at liberty to buy a pair of locally-made boot laces. Of course, he said, in common with other countries, we are fighting trade unionism, whose hide-bound adherence to ancient shibboleths and persistent disregard for their countrys' welfare are earning general contempt and condemnation and the curses of their posterity. He said that, as regards capital, one could raise it to mine gold out of granite, or grow potatoes in the Kalahari desert, but finance was not so strong when it came to backing up industrial concerns.

The employees of the smelting works at Pirie, which in January last suffered severe damage through fire, have accepted lower pay in preference to longer hours.

A film depicting the interior of a steel furnace during the melting of the metal has been shown to those interested in railway construction at the London Office of the Leeds Forge Co. The film illustrated the manufacture of one-piece steel under-carriages for railway coaches by the Commonwealth Steel Co., of St. Louis, U.S.A. It is stated that the casting of these steel under-carriages in one piece has greatly reduced the cost of keeping railway stock in condition, as they are practically indestructible.

Timber and Building Materials.

Timber is still inclined to go easier. 3 x 9 deals are 1s. 1d. to 1s. 2d.; scantlings, 1s. 1d.; beaver board, 5d.; Oregon, 8s. to 9s. (a drop of about 1s.); pitch pine, 10s. 6d.; floorings, 7d. to 7½d.; ceilings, 5½d. to 5¾d.; corrugated iron, 9½d. to 11d. Stocks of timber on hand are abundant; business is very quiet. Bricks are selling at for blue stock, 70s.; mixed, 60s.; wire cuts, £4 10s. to £5; pressed, £5 per 1,000 at yards; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; blue lime, 3s. 9d.; blue plaster, 4s. 9d. to 5s.; cement, 11s. 6d. per bag.

Second-hand Iron and Timber Yards.

Business remains inactive, people waiting for lower prices, especially in regard to labour. Second-hand iron is ruling at from 6d. to 7d.; timber at about 1s. Tenders are being invited for the erection of Town Hall and Municipal Offices at Vereeniging.

Building Workers' Ballot.

According to latest reports the 15 per cent. reduction proposed by the employers in the building trade is not likely to be accepted by the men.

The Public Works Department, with about £1,000,000 worth of construction authorised, is hung up indefinitely on account of lack of funds.

Cost of Building in Scotland.

Glasgow, which started a building programme of 57,000 houses, has still a deficit of 12,000. The causes for the failure are the big wages demanded by workers and the profits made by manufacturers, merchants and contractors, and the shortening of the working week.

Electrical Goods.

Business in town, along the Reef, and in other parts of the Union is still somewhat slow, but appears to be on the mend. This week, after no strike had been declared, the inquiries for materials have been better than for some time past. There is at the moment no alteration in prices to report, but that quotations will come down shortly is evident from the fact that some firms talk about reducing certain lines from the beginning of next month. Electrical goods are arriving steadily from Britain and the Continent, but up to now there are no signs of any reductions in prices from Britain consequent on the resumption of more or less normal conditions after the settlement of the coal strike. Manufacturers are not slow in cabling contemplated reductions, and the absence of such advices proves that the return to pre-strike levels has not yet been effected and may last longer than we were inclined to believe would be the case. From Germany now and then a 5 per cent. or more reduction comes at intervals; from America we hear that reductions have been effected in prices for some time past, but the state of the Exchange is all against trading with that country at the present time.

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Union's Imports and Exports for First Five Months, 1921.

The contraction of trade is revealed in the import and export totals for the first five months of the year. In 1921 the imports were £24,590,000 as against £31,630,000; exports, £21,900,000 as compared with £42,420,000. The fall in export values is chiefly due to the decline in the value of the wool export—over £10,000,000 sterling—diamonds to the extent of £6,000,000, while hides and skins fell nearly £3,000,000. Among the largest decreases in the general imports are cotton and woollen manufactures accounting for £2,500,000. Motor cars were imported to the number of 1,034 against 4,000 a year ago. A notable decline was experienced in the importation of leather and leather goods, which is only in accordance with the aspirations of the Union towards local production.

Union's Falling Revenue.

The Railway's revenue during the quarter just concluded shows a drop of £1,750,000 for Customs and Excise as compared with the corresponding quarter of last year. Nor is the railway the only sufferer, as more or less all revenue returns are declining.

Union's Raw Material.

At the Annual Congress of the South African Agricultural Union this week the President said the new Agricultural Advisory Board in Pretoria was a step in the right direction. He stated that it was time that they as farmers took much greater interest in the industrial progress of the country. They could at the present time not claim to be producers of all the raw material used in South African industries, but they could produce the greater part, and an incentive to greater efforts in this direction was being offered by South

African manufacturers. A Committee was appointed with a view to taking co-operative action with the manufacturing bodies of the country.

Power Station.

This is undoubtedly at the moment, in spite of a small accession of strength, which does not affect mid-Johannesburg, totally inadequate to present requirements. It is, however, expected that about the end of the present month or early in September more satisfactory conditions will prevail. A new generating station up to an approximate total of 54,000 k.w. capacity, costing about £120,000, is on the estimates.

Railway earnings for the week ended July 30th have shown £28,427 below the estimate, and £34,815 below the corresponding week of last year. On the revenue totals to date from April 1st there has been a shortfall of £118,000 as compared with last year.

Important Mercantile Deal with Germany.

The "Economist" a month ago reports that negotiations have resulted in the purchase of industrial and other material by France from Germany of an amount totalling 15,000,000,000 francs. The commodities to be furnished by Germany include, it is understood, both manufactured goods and raw materials, but principally it is said the purchase of railway material from Germany, including 500 locomotives and 25,000 wagons. The low price of the German mark, as compared with the French franc, is a big factor in the transaction, leaving out of the question the much lower labour equation in Germany.

Britain's Recuperative Powers.

Colonel House, a personal friend of the former President Wilson, pays a welcome tribute to Britain. He thinks Britain has now turned the corner and beginning to retrieve the immense losses caused by the great war and the recent coal strike. He thinks that she is the stabiliser in European affairs, and with a clearer vision than France will eventually not only emerge from her own domestic troubles, but be the cause of settling affairs generally in Europe.

Coal.

It is officially stated that the coal output of Great Britain for the week ended July 23rd is 4,331,000 tons compared with 4,282,000 for the corresponding period of 1920, and that there are still 131 coal pits, normally employing about 26,000 men, that have not been re-opened since the stoppage.

Anglo-Persian Oil Co., Ltd.

This company has submitted for approval at Durban, for the deposit of heavy fuel oils in bond, two steel tanks of about 2,000,000 and 15,000 Imperial gallons respectively, with pipes extending to the Bluff Wharf.

Trading with Russia.

An expedition of five ships is leaving for Siberia carrying 11,000 tons of commodities, principally machinery, tools and railway material. The expedition hopes to bring back in October 15,000 tons of Siberian products. It is hoped that this will be the forerunner of a regular trading service.

The Imperial Conference has finished its work in London, with apparently good results, and the seeds of even better accomplishments sown. In the absence of fuller information it is premature to weigh up results, but so far as reports have reached us the results of the Conference appear to have been very satisfactory. General Smuts has already left for South Africa, with added laurels.

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The S.A.R. and the Coal Trade.

SIR WILLIAM HOY'S VIEWS.

In his latest official Bulletin, Sir William Hoy writes:—Railway earnings show extraordinary fluctuations. From the week ended 11th June they increased progressively and reached £457,185 for the week ended 2nd July. This constituted a record for the present financial year and exceeded the weekly estimate by £22,000. The following week, namely, that ended 9th July, constituted another record, but in the reverse direction. Earnings for that week dropped to £393,088, the lowest since the week ended 3rd January, 1920. Coal traffic has been particularly heavy at Durban and light at Delagoa Bay, where only 78,000 tons were shipped and bunkered in June, compared with 135,000 in January. By 4th July 27,000 tons of coal had accumulated at Delagoa Bay, of which 22,000 tons were stored in trucks. In view of the scarcity of orders, some of the Transvaal mines had to curtail despatches and work intermittently. The arrival of certain overdue vessels about 6th July improved the position at Delagoa Bay, and by the 11th unrestricted despatches from the coal mines were resumed, the accumulation of coal on hand having been reduced to 18,000 tons and the quantity stored in trucks to 12,000 tons. Further export orders of considerable magnitude have been received for fulfilment during July; one vessel for 12,300 tons, one for 10,000 tons, three for 9,000, one for 8,500 tons, and two for 8,000 tons, and there are indications of an improvement in the coal trade at that port. 210,035 tons of coal were shipped and bunkered at Durban in June, just slightly less than the May record. Notwithstanding heavy shipments through Durban and the large number of trucks detained there by the collieries for storage purposes, the supply of coal has been exceptionally well maintained. This, of course, has only been possible through the falling off in traffic in other directions, as trucks cannot normally be used for the storage of 20,000 tons of coal without reacting seriously upon the truck supply. Several interruptions on the Natal Main Line in June and July to some extent interfered with traffic working. 872,790 tons of coal and 672,457 tons of general traffic were carried over the Natal Railway System during the three months ended June last, an increase in the aggregate of 179,632 tons compared with the corresponding period of last year.

Robinson Deep Progress.

During the quarter ended June 30 the operations at the Robinson Deep resulted in an estimated net profit of £43,530 5s. 1d. The amount spent on capital account during the quarter was £25,305 1s. The profit includes the sum of £3,313 7s. 5d., which represents the amount by which the receipts on account of premium up to and including the settlement at 31st March, 1921, have exceeded the estimated realisations as contained in the monthly reports of the previous quarter. The improved tonnage has been generally maintained during the quarter and, coupled with a slightly better recovery and an average reduction in working costs of 2s. 6d. per ton, has resulted in an appreciably better profit. The tramming of rock underground has been re-organised, and all ore mined, with the exception of about 1,000 tons per month, is now being hoisted to the surface through the Chris shaft. Favourable progress is being made with the work in connection with the sub-vertical shaft. The average number of natives employed was 4,372, as compared with 4,228 for the previous quarter. The company's loan indebtedness at June 30, 1921, remains at £300,000. Development footage for the quarter was 4,545 feet. The footage sampled was 2,594 feet, of which 86.6 per cent. was payable, as follows:—Main Reef Leader—1,977 feet; reef width, 27.8 inches; assay value, 21.1 dwts. South Reef—269 feet; reef width, 25.7 inches; assay value, 14.5 dwts.

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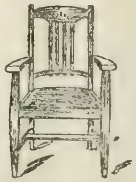

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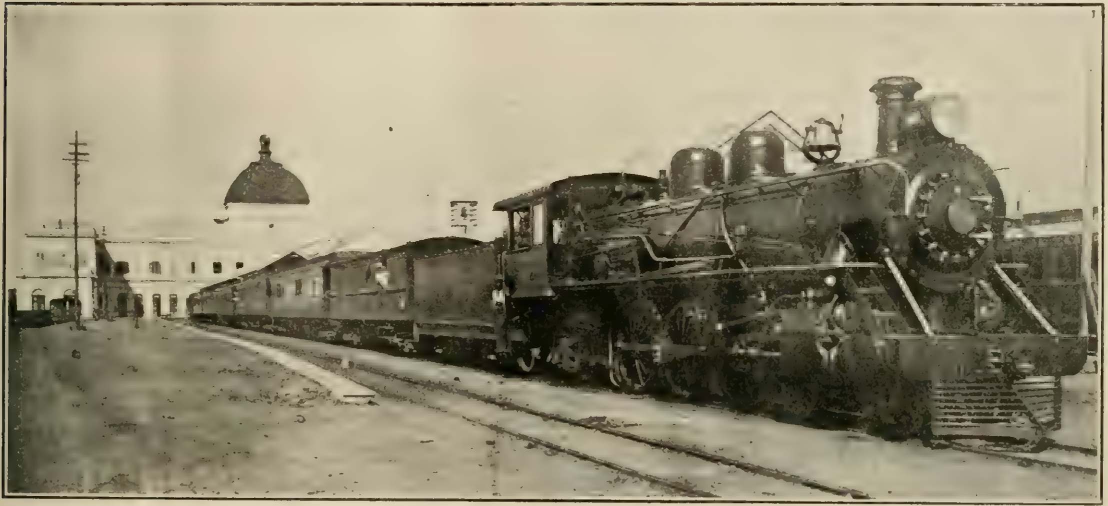
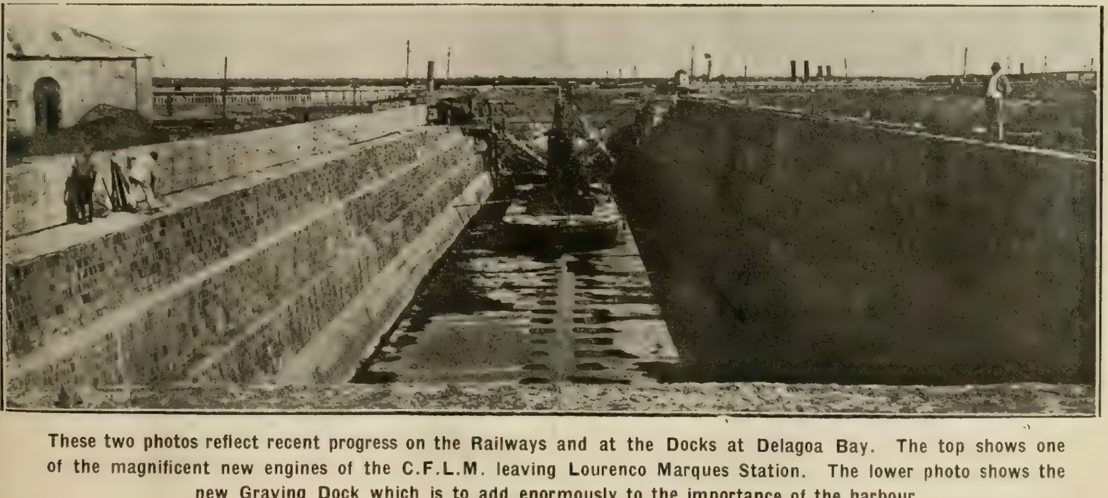
Railway and Harbour Progress at Delagoa Bay.





These two photos reflect recent progress on the Railways and at the Docks at Delagoa Bay. The top shows one of the magnificent new engines of the C.F.L.M. leaving Lourenco Marques Station. The lower photo shows the new Graving Dock which is to add enormously to the importance of the harbour.

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The Prospects of a Business Revival.

FINANCIAL STRINGENCY ACCENTUATED—GOVERNMENT AND RAILWAY CAMPAIGN OF ECONOMY—THE TRANSVAAL MANUFACTURERS' VIEWS—WHAT THE BANKS THINK—DIAMOND PROSPECTS BETTER—IMPROVED LABOUR CONDITIONS—SOME HOPEFUL FACTORS.

Falling revenue and unemployment are giving rise to increasing nervousness throughout the Union, and in the following article we attempt to bring together the opinions of those most competent to judge—i.e., bankers, merchants and industrialists—in regard to the future of business.

The prospect of an industrial and trade revival is the chief concern of the moment. General Smuts is returning without raising the expected big loan for urgent development work in the Union. Retrenchment is being actively exercised in many trades and industries. The temporary hands taken on by the railways are being allowed to go. Sir William Hoy has also addressed an important circular to railwaymen regarding the pressing need for economy and alteration in working hours. The only bright factors are the settlement between the miners and the Chamber of Mines on the wages question and the end of the Durban tram trouble. The low-grade mines seem safe for the time being owing to the maintenance of the gold premium, but that may seriously decline by the end of the year. A revival in the diamond industry seems likely, but it is not expected that it can affect the large producers in view of the enormous stocks of diamonds still in the hands of the selling syndicate.

Sir Wm. Hoy's Bombshell.

Sir William Hoy, General Manager of the S.A. Railways, this week issued the following statement in regard to the necessity of economy on the South African Railways:—

"In view of the serious financial position disclosed by the most recent returns of railway revenue and expenditure, the loss for the first three months of the financial year being £599,427, to which must be added £2,598,884 accumulated deficit at March 31st, 1921, making a total deficit as at June 30th of £3,198,311, the Government has been reluctantly compelled to consider the further steps to be taken to bring about a balance between revenue and expenditure, and to make provision for a gradual liquidation of the deficit. From 1916 to 1920 rates and fares have been increased to the average extent of 48 per cent. in the endeavour to meet the heavy additional expenditure in wages and material, and these increases have not led to the anticipated increase in revenue, and any further addition will probably result in further loss of traffic.

Short Time.

"The Government feels that it cannot justify the maintenance of the present large expenditure in view of the position, and proposes, therefore, as one measure, to reduce the hours of working of the artisan grades by the introduction of short time in preference to general retrenchment. The Government further proposes to revert to longer hours of working in the case of certain grades of employees whose work is not of such an intensive character as to justify the continuance of the eight-hour day in their case. Before taking the necessary steps to give effect to these proposals, the Government is desirous of giving an opportunity to the servants of the Administration to discuss them, and to that end the Minister of Railways and Harbours proposes to invite them to meet him. In order to avoid delay it is proposed that a small delegation from each union or representative body should meet the Minister at Pretoria on dates to be arranged, not later than August 25th, in order that the proposed measures may be laid before them, thus giving them the opportunity to make such suggestions in connection therewith as may seem to them desirable."

The Outlook for Industries.

In a masterly review of the situation, as far as it affects industrialists, Mr. Serocold Skeels, President of the Transvaal Manufacturers' Association, at the annual meeting of that body this week, said that they found themselves in a very much worse position to-day than they had a year ago. This he ascribed to the world-wide trade depression which South Africa could not have prevented; to the slump in the South African wool and maize markets, which, however, he said, now showed some kind of improvement; and, thirdly, to the fact that the Customs tariff had not yet been placed on a scientific basis, but was a hotch-potch of various pre-Union tariffs with no underlying policy.

Importance of Industries.

Mr. Skeels then alluded to the extreme importance of giving support to local manufacture. "The position we are in to-day," he said, "is nothing to what it ought to be, but is, after all, not inconsiderable, the gross value of the manufacturing output for 1920 being at least twice as much as the Transvaal gold output. The position, I say, we are in to-day has been won, not by means of any material assistance given by either the Government or the merchants, but sometimes, perhaps, I fear, far too often, in spite of the merchant, and I was much impressed at the recent Convention of the Chamber of Industries to hear that well-known and successful manufacturer, Mr. John Pyott, say, after having been eulogised by the President of the Chamber of Commerce, that his success after 35 years of hard work as a

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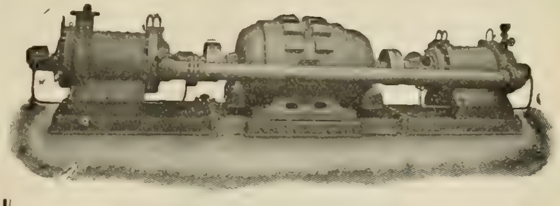

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manufacturer had been in spite of the merchant, and not because of him, and that it was only after he took his commodities direct to the retailer and consumer and the demand became insistent, that the merchant began to stock his goods. We have too many cases of this sort—why, I cannot understand—as the distributor must see that, if we put nothing in the place of the mines, the output of which is diminishing year by year, it will not be long before the purchasing power of this country will be such that there will be very little for the distributor to distribute."

The Standard Bank View.

The latest Standard Bank monthly review of trade says that, reviewing the situation as a whole, the outlook is if anything a little better than during the earlier part of the year, and in the absence of unforeseen disturbing factors, it is possible, as already stated, that there may be a slight improvement in trade conditions. It goes on to say that wholesale and retail trade continues quiet, but there has been some improvement in country business, and slight further improvement may be looked for when the mealie crop is sold and disbursements in connection with the portion of the 1919-20 wool clip purchased by the Imperial Government are made. Winter and stocktaking sales have helped to reduce surplus stocks in some centres, though ordinary business turnover is still restricted, and an adverse factor is the increasing amount of unemployment.

A Commercial Opinion.

At the annual meeting, last month, of the Association of British Chambers of Commerce, the President, Mr. J. A. Hobson, in a review of the previous twelve months' conditions, referred to the world-wide stagnation of trade. He attributed the principal causes to the destruction of wealth due to the war, the difficulty of extending credit in other countries owing to economic conditions, and the unwillingness of work-people to realise that wages must be readjusted or efficiency increased. There is no quick or sovereign remedy for the present position, the difficulties of which can only be overcome by industry, economy and patience.

The National Bank on the Position.

In its review for last month the National Bank writes:—"Trade conditions continue dull. Some centres report that there is less activity than during June, and that an early improvement appears unlikely. On the Johannesburg commercial exchange forced liquidations have had a depressing effect. The continued falling off in railway revenue and the uncertainty of the outcome of the negotiations with regard to miners' wages have been largely responsible for nervousness in commercial circles."

Since this was written the last-named trouble has, of course, been settled, but the railway revenue remains a disturbing factor.

A Rand View.

It may be recalled that the President of the Johannesburg Chamber of Commerce, Mr. R. Blane, made an interesting analysis of the business position at the monthly meeting of the Chamber the other day. Mr. Blane put the matter in a nutshell when he said that we were suffering from the inevitable reaction and trade depression following the abnormal post-War prosperity. He showed that the reason was the financial state of affairs existing overseas, and that there was not much hope of improvement until the position in overseas countries was established on a firmer basis, and until social and economic influences take a turn for the better. In other words, South African trade cannot escape the consequences of the chaotic conditions elsewhere. Its imports and exports are vitally affected thereby and all we can do is to await the return of better world conditions. Meanwhile Mr. Blane urged Government, public bodies, and everyone to exercise the utmost economy and care.

Concerning Mines and Men.

Mr. J. Dale Lace has returned from his business trip to England.

* * * *

Mr. Stanley Maynard, of Messrs. James Neilson & Maynard, the well-known stockbrokers, has returned from his health trip to the coast.

* * *

Sir Bernard Oppenheimer, one of the leading figures in the diamond industry, who founded the diamond cutting works for disabled soldiers at Brighton, left £373,595.

* * * *

Mr. Sam Thomson, who was for years consulting engineer to Messrs. S. Neumann & Co., of London and Johannesburg, has taken charge of the Kirkland Lake Proprietary Company's mines.

* * * *

It is understood that at a special meeting to be held shortly it will be proposed that Sir Henry Strakosch (managing director of the Union Corporation) should be appointed to the London committee of the Burma Corporation.

* * * *

Mr. A. H. P. Moline, mine superintendent of the Bendigo Amalgamated Goldfields, Ltd., Vic., who has been abroad on the company's business, has returned to Australia *via* South Africa, where he inquired into the latest mining methods and steps for combating miners' phthisis.

* * * *

It is with deep regret that we record the passing of Mr. R. S. Ward Jackson, for many years editor of the "Rand Daily Mail" and managing director of that paper and of the "Sunday Times," who died this week after a brief illness. Mr. Ward Jackson was one of the best known and most highly respected newspaper men in South Africa and his death will be a real loss to the public life of the Rand.

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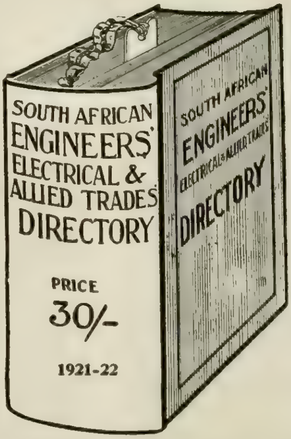

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Rand Working Costs and Efficiency.

SOME PRACTICAL SUGGESTIONS FOR IMPROVED WORK ON THE SURFACE AND UNDERGROUND.

By P. Woolf.

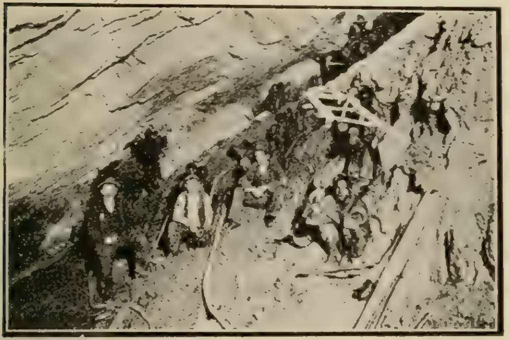
In this paper Mr. Woolf, who has had experience both underground and as a metallurgist, sketches a series of valuable suggestions based on practical experience.

I purpose dealing with this subject under two main headings, underground and surface. I hope to cover practically all sections of the work of a mine and all suggestions for improved work are based on actual practical experience.

Underground.

(a) *Vertical Shaft Sinking.*—The first consideration is speed. Therefore we must select the machines and methods which will give this result. Holman sinkers are to be preferred over reciprocating machines or jackhammers. No rig is necessary and they will drill longer holes and break more ground than the jackhammer. Their upkeep is low. Sufficient machines and drills must be provided to drill over the whole of the bottom in 2½ hours.

In sinking the bottom is practically flat excepting for a sump at either end of the shaft to collect the water and so give facilities for its rapid removal either by baling if the quantity is small or by sinking pumps if large. A 4 in. air main delivering air at 80 lbs. per sq. in. and a 2 in. water service are necessary. A sirocco fan of large capacity will sweep out smoke and bad air rapidly, enabling the cleaners to quickly start work after the blast. Spare machines and drills should always be available in case of a breakdown. Rings should be built below any fissure to prevent water reaching the bottom of the shaft. These can be either baled or pumped, depending on the quantity of water made. Sinking may be carried on with skips or kibbles. Kibbles are more often used in preference to skips. They are quicker. Timbering is generally kept about 50 feet from the shaft bottom.



Deep Mining on the Rand.

Payment is best made on the sliding bonus system, with a fixed guarantee. The bonus should be so arranged that it increases every 10 feet; a minimum footage being first fixed. Shaft sinking is dangerous and unhealthy work and the mine that does not offer substantial bonuses will not attract good men. The cleaners and drivers should alike share in the bonuses.

(b) Incline shafts should, for rapid hoisting, be sunk at one uniform grade 50 feet under the reef. In incline shaft sinking it is necessary to sink rapidly and at the same time avoid any interference with the rock hoisting. This can be secured by having a separate hoist with a quick and easy method of emptying the trucks or skips which are used for cleaning. If the distance the rock to be hauled is short, use ton trucks; if long, use two-ton skips. The necessity of keeping the timbering as close to the face as possible is a pressing one, because with temporary tracks derailing often occurs, resulting in frequent and costly delays. The drop set generally used at the shaft bottom should be made of 60 lb. rails held together by three 1 in. bolts nutted inside and out. The machines I prefer are Climax or Water Leyners, and as with vertical, sufficient machines and drills will be necessary to drill over the whole of the shaft bottom in four hours. Spare machines must always be available.

Many men prefer jackhammers in incline shaft work, but the average daily sink using jackhammers one shift per day will be two feet, whilst with Climax or Water Leyners it will be nearly four feet. The ventilation at the bottom of an incline shaft must be attended to. A good system is to brattice off the ladder way side and put in a fan or blower operated by compressed air. This will start a circulation and draw off the smoke. It is essential to build a dam or ring of about 1,000 gals. capacity below the lowest hoisting box in order to collect all water which escapes down the shaft and at the same time serve as a sump for pumping water from the shaft bottom. This should be fitted with a trap for cleaning out the mud. The pumps drawing from the sump will discharge into the settling sump of the main water main service, which is generally situated on the bottom level. 4 in. air at 80 lbs. per sq. in. and 2 in. water mains will be required. The system of payment should be similar to that stated under vertical shaft sinking.

Five Thousand Feet below Surface in a Rand Mine.

(c) *Development.*—Crosscuts and drives can be advanced by Water Leyners or Climax machines. The Water Leyner will drill faster, but the hollow steel necessary is expensive and often brittle. The mining regulations insist on axial water feed machines for raising, etc., otherwise a saving could be effected by using solid steel as is done with jackhammers. The Climax machine has low upkeep expenses and works steadily.

Drives should always be kept to grade of 1 in 100 by grade pegs and, for single tracks, driven 8 ft. wide by 7 ft. high. The drain and track should be made on the footwall side. A 3 in. air and 2 in. water mains follow the developer to be afterwards replaced when stoping commences by 6 in. air and 3 in. water services. As a rule permanent tracks follow the developer, but it sometimes pays to relay the track and slope off corners, avoiding any sharp turns. Check rails should be used where sharp bends are unavoidable, especially with animal transport.

Air pressure at any working face should not be less than 70 lbs. per sq. in. and a standard pressure gauge should be regularly used for testing pressures at the face.

Raising.—The machines best adapted for raising up to 45 deg. dip are Water Leyners, above this dip, water-fed jackhammers on a light suitable rig give the best results because much time is lost in pulling down and rigging up the heavier Water Leyner rigs on steep dips. A strong water pressure is necessary in all raises. A 2 in. lead taken off the drive main by a bend should give sufficient pressure provided the water system is good. Raises should be carried at least 7 x 5 and always on lines along the true dip, unless there is some special reason for departing from this. The same applies to winzes. Winzes can be sunk best by Climax machines, although jackhammers give very good results. The greatest care must be taken to use just sufficient water, otherwise the face may be flooded. Winzes will be cleaned out by small skips operated by air hoists. The native gang cleaning should be encouraged to quickly clean out and allow the miner to make an early start.

(d) *Stoping.*—Water Leyners, Climax and jackhammers are the machines most frequently used. The jackhammer is rightly displacing the other machines where the dip is suitable. It requires one native to operate against two with the others. It is a rapid driller and its up keep expenses compare favourably with the other machines. The successful use of solid steel in place of hollow for drilling has materially reduced the cost of drilling.

On average Rand rock a 42 in. hole can be drilled in 30 minutes with 70 lb. air. It is not too much to expect ten holes per shift per machine, which with the average miner gives a machine efficiency of one fathom. The average number of holes per machine shift is about five and the machine efficiency is ·5 fathom. The causes of this inefficiency are:—

(1) Shortage of jumpers due either to bad distribution or an actual shortage for the number of machines working. It is false economy to economise on jumpers. A good system of distribution is vital. Each machine should start off with ten sets of steel. All worn and broken stumps must be put by the miner in his jumper box at the end of his shift and replaced by sharpened ones before commencing his next drilling shift. All jumpers should be accounted for once a month, and the man who makes a habit of losing jumpers should lose his job. A jumper store underground will increase efficiency.

(2) Late starting of work. The average miner starts badly. He will lose an hour a day picking winners when his machines should be drilling. The machine efficiency test will find out the worst offenders. These must be eliminated.

(3) Broken air and water services. Start the pipe fitter two hours before the miner and this will be rectified.

(4) Delays due to the face not being lashed down. The lashing and tramming gangs should commence work two hours before the miner, and this delay will be practically avoided. A liberal use of water, chutes stationary and swinging, tramming in flat stopes all materially increase the speed of lashing. Finally, the boys must be taught to lash.

(5) Delays due to tramming. Have well-laid tracks, properly balasted and good boxes. Rails of 25 lb. per yard set at 2 ft. 6 in. gauge, taking ton cars with loose wheels, will speed up the tramming. The track graded at 1 in 100 with a good drain on the footwall side will keep the track clean. Good tipplers with switches and sidings for the empties are necessary. Stope boxes should be wide with the lip extending 6 in. over the plane of the rail nearest the box and 6 in. above the top of the car. The ore should run freely from the box to the waiting car. Stopper boards, 9 in. by 3 in., are cheap and effective, being easily removed and replaced in U iron when loading cars. Select the biggest and strongest boys as trammers.

(6) Low air pressure. Those mines which generate their own compressed air are often the worst offenders. The remedy is obvious. On those mines where compressed air is purchased it is frequently found that the pressure at the end of long drives is below 70 lbs. per sq. in., very often below 50 lbs. This is due to the small diameter of the air mains along the drives. A 6 in. air main along drives will be found ample.

(7) Low water pressure. A central dam at the top of the incline kept at steady head with clear alkaline water requires but little supervision and with the adoption of large diameter mains will reach every working face. A good water service is just as essential to mining as it is to milling.

(8) The average miner is inefficient. The skilled miner has practically vanished. The best of the men to-day are those who were learners to those men; the remainder, the majority, should be taught. The industry is doing very little towards making them efficient. Each mine should have men on their staff whose sole occupation should be to go into the stopes and teach these men how to break ground. These staff men should be selected from the best rock breakers. The fathom machine efficiency test will distinguish the "triflers." Each month after stope measuring a list showing each man's machine efficiency should be drawn up and posted in the change house.

(e) *Reclamation.*—When a stope is beaten back 200 feet from the rise reclamation should commence and the stope scraped and washed up to 50 feet of the face. Skeleton pigsties are built and reef packs removed wherever it is safe to do so. Delaying reclamation often means loss of sweepings due to the stope caving.

(f) *General.*—Keep the stopes in good shape. The toe of the stope should always be one box ahead, roughly 20 feet. The lashing, tramming, pipe fitting, reclaiming and timbering gangs should start work at 6 a.m., the drilling gang at 8 a.m.

An underground store, as recently described in the *S.A. Mining and Engineering Journal*, should find a place at every shaft where machines are working. The store should carry a good supply of jumpers.

Surface.

The mill to-day draws its ore from several shafts and where there are no complications machanical haulage is cheapest and most efficient for surface transport. Steam or electric haulage can be installed, where mechanical haulage is not practicable. Conveying ore from crusher station to battery can be efficiently done by conveyor belt with a maximum angle of rise of 18 deg. Belt speed to be 400 feet per minute.

Sorting is badly conducted on many mines. More attention and enthusiasm shown in this department by officials would result in a marked saving and increased efficiency. It was suggested by Schmitt in 1911 that a considerable saving could be effected by taking the fines from the grizzlies and trommels at the sorting station direct to the tube mills. Experiments along these lines have now reached finality with one group and it is proposed to transport all the fines passing 1¼ grizzlies to the tube mills. Should the tube mills economically crush this rock to the desired grade, the knell of the stamps will be tolled and the future mills on the Rand will consist of coarse and fine rock breakers with tube mills to finish.

The present classification system for separating sands and slime is too expensive. This is due to the excessive height the whole pulp has to be elevated to obtain sufficient head for the gravitation to tube mills, sand tanks, etc. The pulp from the stamps should be properly distributed direct to Dorr classifiers feeding the coarse material to the tube mills. No pumping is required excepting for the final elevation of the sand and slime to their respective plants.

The slimes should be treated by the counter current decantation process. It is cheaper to run and will give lower soluble gold losses than either multiple decantation or vacuum filtration. Rand slime is eminently suitable for the process. Every mine should have a well-equipped foundry in which the scrap can be used and all simple castings made on the spot. Labour charges are light and there is plenty of work to be done to keep the men busy. Finally, the largest factor in efficiency is the manager. If he is efficient the mine is.

Position and Prospects of the T.G.M.E.

EFFECT OF THE GOLD PREMIUM—NATIVE LABOUR SCARCE—LOWER ORE RESERVES—PROSPECTING AND DEVELOPMNT.

The annual meeting of the T.G.M.E. will be held next month. From an advance copy of the annual report we learn that for the year to 31st March the profit was £89,751. Only one dividend was paid, absorbing £15,105, and the balance unappropriated carried forward was increased to £170,110, compared with £109,034 brought in. The final instalment of debentures was redeemed in April. For the half-year ended 31st March the net profit was approximately equivalent to the amount required for a dividend of 5 per cent. The price of gold, which at the beginning of the half-year was £5 17s. 6d. per fine ounce, had, however, fallen to £5 2s. 9d. per fine ounce, with a tendency to fall still lower, and monthly profits were greatly reduced. The average profit for the last three months of the year was only £2,407. In view of these circumstances and of the existing acute economic and financial conditions, the directors deemed it inadvisable to declare any dividend per 31st March, 1921. They were of opinion that the company's funds should be conserved with the definite object of placing it in a position adequately to meet all contingencies, and especially to enable it to carry on prospecting and development of its large properties. Without adequate reserves the work of exploration would have to be abandoned in the event of any further fall in profit.

Working expenditure continued at a high level, no relief having yet been secured from the high cost of labour. Several economies have been effected, and the company has withdrawn from the Transvaal Chamber of Mines. Steps are being taken to transfer to the Custodian of Enemy Property shares vested in him by order of the Supreme Court.

Ore Reserves.

Mr. A. J. Brett, consulting engineer, gives the following comparative figures for the past two financial years:—

	March 31, 1920.	March 31, 1921.
Tons milled	190,060	194,560
Yield per ton—dwt.	7.511	6.740
Working costs per ton	29s. 1.4d.	29s. 1.2d.
Revenue per ton	37s. 5d.	37s. 1d.
Profit per ton	8s. 3.6d.	7s. 11.8d.
Sundry revenue	£8,583	£12,052
Total profit	£87,460	£89,752
Development footage	61,588	40,463
Ore reserves—milling tons	662,754	602,870
Average value of ore reserves—dwts. per ton	8.6	8.5

£89,358 were received from realisation of gold in excess of standard value, as against £55,318 during the previous year. It will thus be seen that although a slightly increased profit was made for the year, this profit was entirely due to the price received for gold. A further decrease in the yield of the ore milled was shown at the Central Mines, while Vaalhoek Mine showed a slight improvement in grade, and the Elandsdrift Mine a decrease, the result being that the total yield was so low that without the increased price obtained for gold practically no profit would have been earned. It is anticipated that the yield for the present year should be approximately the same as that of the past year, as there has been no material decrease in the value of the ore reserves. Unless, however, the price of gold is maintained or the workings costs lowered materially, the outlook is not too satisfactory.

The ore reserves show a decrease in tonnage of 59,884 tons, and a decrease in value of 0.1 dwt. per ton. The Central Mines and the Vaalhoek Mine are responsible for the decrease in tonnage, although the ore reserves at the latter are not final, due to the loss of their records at the time the office was blown away. Development during the year has been considerably restricted owing to shortage of native labour. During the month of May a stike of natives occurred on the mine, and although the work was only stopped for a short while, the most serious result has been that ever since the mines have been unable to obtain sufficient labour to carry on a full programme of development and prospecting. The result of the prospecting and development that was done during the year, although it opened up nothing of very high value, must be considered fairly satisfactory, in that two or three localities showed promise of yielding fair tonnages of quite payable value.

Native Labour.

Mr. R. A. Barry, the general manager, says the governing factor in prospecting has been the scarcity of native labour. Ever since the influenza epidemic in October, 1918, native labour has been difficult to secure, but this difficulty was gradually being overcome when the strike of natives took place at the end of May, 1920. Since then there has been barely enough labour to keep the mills running. Prospecting operations have suffered as a consequence even more than development. The little labour available has been concentrated upon opening out the more promising prospects around the Central Mill area, but much important work has of necessity been at a standstill. Work done has mostly resulted in disclosing low-grade rock, with here and there something of rather better promise.

The company is far from having exhausted its areas or its resources, and time is a factor in its favour—as long as it can keep working energetically and on sound lines. The total expenditure on prospecting during the year amounted to £11,623, a decrease of £5,458. The Chi Prospect on the Portuguese Reef horizon has given encouraging results, and the expenditure in this direction should not be in vain. In this area over 20,000 tons of an estimated stoping value of 7 dwts. per ton have now ben developed. There is also some promise of fresh payable areas on the Graskop Hill section. Again, the area to the west of and below the old Day Mine area holds out some hope of payability. At Grootfontein the tributor met with no success. On the eastern slopes of Jubilee the tributors have disclosed intermittent patches of payable reef. The estimated total value of gold won by them since the date of their tribute (January, 1919) to the end of March, 1921, is just over £19,000, of which 10 per cent. has been paid to the company. They also do 50ft. of development each month for the company at their own cost.

Considerable work was done on Driekop, in the Glynn's horizon, but without disclosing anything of value.

Prospecting.

On the Beta Reef horizon, west of the Blyde River and beyond Brown's Hill, some 10,000 tons of 8-dwt. rock have been opened up. Further prospecting here had to be discontinued pending a better supply of labour. This is greatly regretted, but as the reef is thin and very hard, it would be inadvisable to attempt to push the work under present conditions. A good deal of prospecting in the Shale Reef horizon also awaits labour. This area is important, but the reef is very erratic and difficult to follow. At Vaalhoek work has been handicapped by water troubles, as well as by scarcity of labour. The reef horizon lies at some depth, and work is neither easy nor cheap. No fresh payable areas of any extent have as yet been disclosed. At Elandsdrift very little prospecting has been possible. There are some indications of gold underlying Spitzkop Hill area to the north of Elandsdrift Mine. On the whole prospecting operations point to the hope of the company being able to maintain its position, and the future is by no means without promise.

Development.

At the Central Mines development was greatly hampered by native labour scarcity. Since the native strike in May, 1920, it has not been possible to resume development as actively as wished. Unfavourable conditions were encountered in the most important development areas, Brown's Hill and Ponieskrantz North. Duke's Hill is being slowly worked out. The old Day Mine is now worked out, but some hopes are entertained of an extension being proved by prospecting operations. At Peach Tree, both quantity and value of ore have been reduced. The two Iota Mines are very low grade. At the Theta Mines the reef continues thin, yielding low tonnage; the position has, however, been satisfactorily maintained. Values in the extension have fallen; more development is important. The country rock over a large section of Brown's Hill Mine has become exceedingly hard, whilst the reef, though payable, is very thin. With insufficient natives available, development suffered very much in this area, and tonnage efficiency per boy has fallen considerably. Payable ore reserves show a slight drop both in grade and quantity. At Graskop reserves show a small increase, but values have declined. Stoping has been resumed. Ore reserves on Columbia Hill shales show an increase in quantity, but rather a lower value. The reef continues very erratic and uncertain. A good deal of development has been done at Ponieskrantz North Mine during the year, despite grave labour difficulties, but unfortunately values have been disappointing, especially in one section of the mine. The reef, too, contains a high percentage of copper. Despite these drawbacks the position at this mine is satisfactory, and as a unit it presents a valuable asset.

At Elandsdrift Mine neither the quantity nor the quality of native labour is now what it used to be. This factor, combined with water and power difficulties, has hindered progress greatly, and it has not been possible to prove the mine in depth as quickly as hoped might be possible. Scarcity of power makes it inadvisable to embark on development work on a large enough scale to enable water difficulties, bad ground, and other mining problems likely to be encountered in depth to be grappled with successfully. Ore reserves have, however been maintained at approximately the same level as last year.

Vaalhoek.

Development at Vaalhoek could not be maintained on account of labour shortage, so that ore reserves have diminished. Indications of the future in the river section mine are on the whole promising, but water constitutes a great difficulty, and the reef is apt to be full of " pinches " and caverns. On 23rd March Vaalhoek was visited by a severe cyclone. Great damage was done to the building and store, whilst the mine itself was only prevented from flooding by the good work of the staff. All mine plans and records were swept away. Fortunately, and by great good luck, no actual loss of life was suffered, though Mr. Ford, the resident manager, and others were severely knocked about and shaken. The reserves are conservatively assessed at 67,000 tons of 8.5 dwts. Prospecting has not yet proved the reef very much in advance of the mine workings, but is being pursued as far as conditions allow.

The South African Asbestos Mines, Ltd., of Tubex, Malip's Drift, Pietersburg, are inviting some 150 guests to the mine property.

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LARGE STOCKS ON HAND.

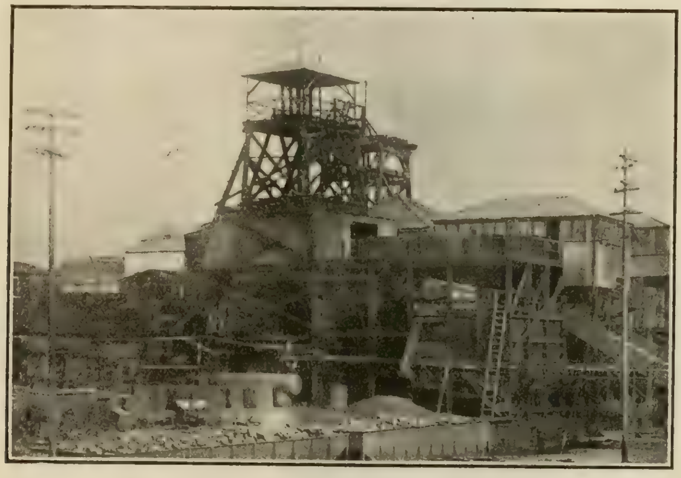
The Appalling Wastage of Coal.—I.

THE LOSS TO SOUTH AFRICA—LESSONS FROM OTHER COUNTRIES—NEED FOR CO-OPERATION BETWEEN COLLIERIES AND GOVERNMENT.

One of the most important matters dealt with in our Special Coal Number—which is now being rapidly sold out—is that of the wastage of coal in all its phases. The following article redirects attention to this vital and urgent question.

One of the biggest problems of industry all the world over is the conservation of fuel resources and the economic employment of coal. The general public has no conception whatsoever of the amount of latent energy that is wasted in present-day methods of mining and marketing coal and in obtaining from it power and heat.

In the United States of America it is calculated that under ordinary conditions of mining and firing, out of every 2,000 pounds of steam coal in place in the mine, only about 76 pounds are converted into mechanical energy —a most surprising fact. The other 1,924 pounds are either unavailable or are absorbed by the eight losses shown in the sections of the columns. This means a recovery, as proven, of only 4 per cent. of the resource, assuming steady operation. Allowing for further losses due to bad load factor, as is shown in the second column, the recovery becomes perhaps 1 to 2 per cent.



On the Witbank Coalfields—An Area Littered with Waste Dumps.

To develop 1,000 horse-power, a theoretically perfect steam engine and boiler would require about 600 pounds of coal. Actually, under ordinary practice, we mine or destroy perhaps 15,700 pounds of coal in the seam in order to develop the 600 pounds of energy. The best practice does the same work with about 1,320 pounds of coal. In other words, the best practice uses only a tenth or a twelfth as much as the average.

Another Aspect is the Loss in Chimneys.

Every chimney on every power plant is by nature a thief. Give them a chance and they will rob you of fuel. Many have been broken of their heat-pilfering ways by the hand of science, but a much greater number of them still stand as monuments even in America to the spirit of wastefulness.

Of two exactly similar chimneys standing side by side, the most skilled observer could not tell by merely looking at them which one was guilty and which one innocent of robbing its owner of heat and depriving the nation forever of just so much of its most precious natural resource—fuel Everybody knows that smoke means unconsumed fuel and still a chimney belching forth dense black smoke is very likely to be less of a waster than its innocent appearing smokeless twin. In spite of the popular impression to the contrary, smoke, nuisance though it is on its own grounds, seldom represents a loss greater than one per cent. of the fuel.

Heat escaping up the chimney represents by far the biggest fuel loss. The remaining losses of fuel, principally due to radiation from the boiler and furnace covering and to fuel actually escaping before it has been completely burned, are insignificant in comparison to the chimney loss in the great majority of plants.

In the average boiler plant in the United States of America 35 per cent. of the heat in the coal burned under the boilers is lost with the stack gases. That is, out of every 100 tons of coal burned under the boilers, the heat of 35 tons literally goes up the stack. It is this loss that can be greatly reduced, and every effort should be made to do so. The stack loss is so large because its magnitude cannot be readily detected, but can be found only by the use of special instruments and carefully kept records.

United Kingdom Wastage.

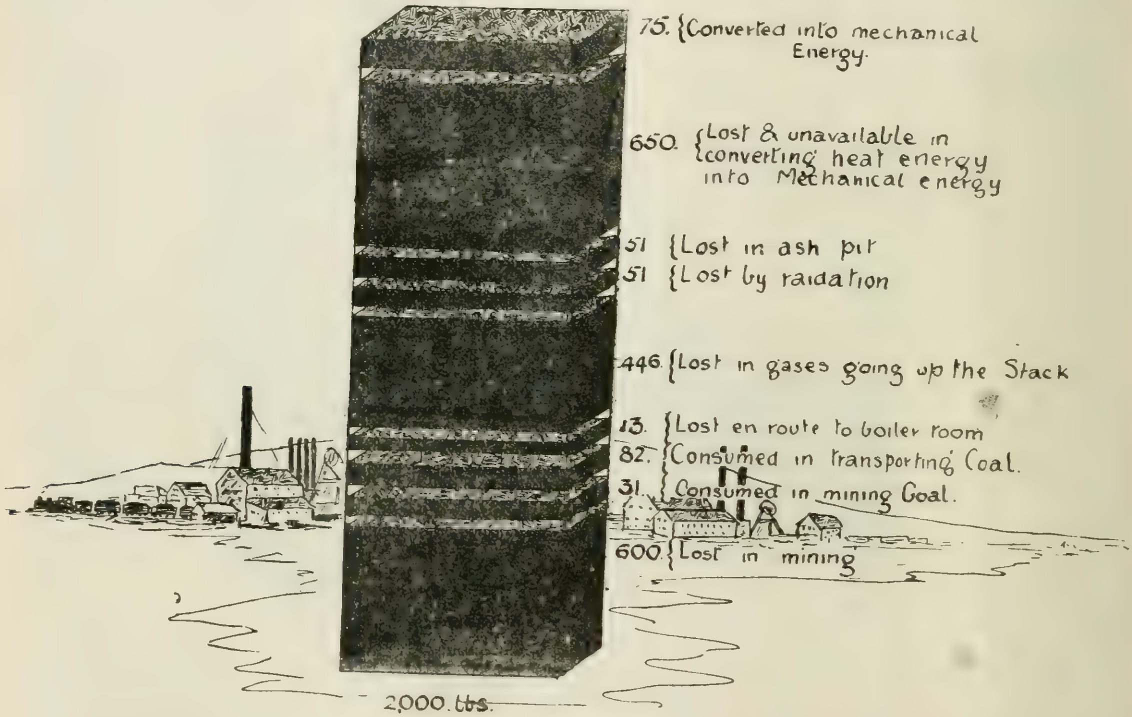
Consider, too, the position in regard to wastage of coal in the United Kingdom. Sir Dugald Clerk, in a paper on "Coal Conservation in the United Kingdom," read before the Institution of Civil Engineers some little time ago, made the suggestion that non-condensing steam turbines and steam heating for a city was essential if the Coal Conservation Committee's aim of economy for power and heat was to be attained, and stated that by the adoption of a certain steam power and heating system there could be saved one-half of the present fuel used for domestic purposes. That system, being operated from boilers supplying the engines with steam containing 80 per cent of the heat of combustion of the coal used on the boiler furnaces, and with 10 per cent. deducted for motive power, would leave 70 per cent. of heat still available, which, after distribution and use, could give an efficiency of 50 per cent. That meant 35 per cent. of the original heat of the coal would be available for heating rooms and domestic cooking. The coal at present used for domestic purposes gave a combined efficiency not exceeding 15 per cent.

If such wastages occur in long-established and well-organised countries like England and America, it can safely be assumed that an even greater percentage of loss occurs in South Africa, a young Dominion, which has scarcely yet emerged from the stage of belief that the ultimate destiny of a piece of coal is the heating of a boiler on a Rand gold mine or a Natal sugar factory.

The Government's View.

The waste that takes place in our coal industry may roughly be divided under two heads: (a) wasteful mining methods; and (b) wasteful methods of the utilisation of the coal after it has been raised to surface.

Some little time ago, when speaking before the Advisory Board of Industry and Science, the Secretary for Mines of the Union said that an important matter being dealt with by the Department at the present moment is the coal question, which has various aspects. A special mineral survey of our known coal resources is being made. The Department has drawn attention on previous occasions to the waste which is going on at the present time in the working of the Transvaal and Northern Natal fields. Nature has placed several seams of coal in close proximity, with a very shallow parting, and in the greater portions of the areas mentioned the lowest seam has the higher califoric value. The result is that as this seam is worked and taken out the sandstone parting with the seam above it falls in, and the result is that for every ton of coal won, one or two tons of nearly equally good coal is being lost to the world, and can never be mined in future, owing to the crushed state of the ground. According to the inspectors' reports, over 60 per cent. of the coalfield is being sacrificed in some areas. In older countries, mineral owners have been accustomed to insert in their mineral leases covenants in regard to the manner in which the known seams underground shall be worked, and it would really appear that in the national interest something of the same kind is urgently required in South Africa, and the Government should be empowered to regulate working, so as to prevent excessive waste. Large tonnages remain of lower-grade coals, which can no doubt be used in the future for generation of electrical power in bulk, while our better class coals, which can bear the cost of transport, could be used for the export market.


75. {Converted into mechanical Energy.
650. {Lost & unavailable in converting heat energy into Mechanical energy
51 {Lost in ash pit
51 {Lost by raidation
446. {Lost in gases going up the Stack
13. {Lost en route to boiler room
82. {Consumed in transporting Coal.
31. {Consumed in mining Coal.
600. {Lost in mining
2,000. lbs.

HOW COAL IS WASTED.

This Diagram exhibits the astonishing fact that out of a short ton of Coal only 75 lbs. is converted into mechanical energy.

A Million Tons a Year Wasted.

It has been estimated that approximately one million tons of coal are wasted every year from the collieries of South Africa. Waste is a necessary accompaniment to coal mining, and is not peculiar to South Africa. At the same time, the problem of the utilisation of this waste coal has received serious attention in various coal-producing countries, and in the United Kingdom a Fuel Research Board was constituted in 1917 by the Imperial Government to study the matter. In South Africa, too, the problem has not been lost sight of. It has, in fact, been receiving the serious attention of the Department of Mines and Industries for a long time past, and some months ago the Department asked the Advisory Board of Industry and Science to investigate the possibilities of utilising this waste product. The Board appointed a sub-committee, consisting of Professor G. H. Stanley and Dr. W. A. Caldecott, to inquire into the matter, and the following extracts are taken from their report.

Before quoting this Committee's report, it may be observed that the Government Mining Engineer (Sir Robert Kotze) in 1917 advised the Department that, although the percentage of waste coal is fairly high, it is constantly going down, and is likely to continue doing so. In 1910 the percentage calculated on coal sold was about 32, but since then the power companies have been buying the fine waste formerly dumped, and the sale of "peanuts" has also increased, thus accounting for the fall in recent years.

The following are the amounts of discarded waste, expressed as a percentage of the coal sold, for all collieries in the Union:—

1910 (seven months)	32 per cent.
1911	30 per cent.
1912	24 per cent.
1913	21 per cent.
1914	19 per cent.
1915	19 per cent.
1916	20 per cent.
1917	18 per cent.
1918	16 per cent.

It is considered that a certain amount of waste is inevitable in the early days of any industry, and our coal mining industry, Sir Robert points out, is still in the infantile period.

The Committee's Report.

In considering methods for the utilisation of waste coal the question should not be entirely divorced from that of the obtaining of a better or complete utilisation of all the coal mined, which has recently been receiving so much attention oversea, more especially as a better utilisation of coal in general obviates the production of dump coal.

Coal is, of course, mainly utilised as a fuel directly for various purposes, but is more and more becoming, by suitable treatment in connection with its use as fuel, the source of an enormous range of chemical products, the use and demand for which continually increases[*] Tar, benzol, pitch, and ammonium sulphate are among the more easily obtained. Many others, of course, being the products of closely specialised industries, for which these form the raw materials.

For heating purposes alone, in connection with furnace firing, more efficient methods could very frequently be employed, *e.g.*, recuperative systems; and it may be noted that the use of powdered coal is largely extending elsewhere, and is attended with considerably increased efficiency and economy. Coal-dust firing is already used in South African cement works, and has been experimented with in the Bettington boiler. Nevertheless, the applicability is somewhat limited, and no by-products are obtained.

The full utilisation of coal, however, calls for the production of the various by-products it is capable of yielding by suitable treatment, as well as for the most efficient means of using its full value.

Under local conditions, and for various reasons (*e.g.*, it would call for very heavy capital expenditure and the scrapping of a vast quantity of existing plant), a very full utilisation can scarcely be expected; nevertheless prevention, or at least a considerable reduction, of the waste now occurring should be possible by directing attention to the dump coal at present unutilised.

In considering the question of the utilisation of coal there are two points of view which must not be lost sight of, and which are to a great extent conflicting.

These two points are: (1) the natural, *i.e.*, the conservation of natural resources of the country, and (2) the individual, *i.e.*, that of the colliery owner, and obtaining of the largest immediate profit per ton. There is, moreover, the user to be considered, who needs his coal, heat, or power as cheaply as possible.

However, under (1) a complete utilisation, under a given set of existing circumstances might well be technically impossible or financially unprofitable, while under (2) the exploitation of natural resources may be carried out in such a manner that a very large proportion may be absolutely wasted in order to secure an immediate individual advantage.

Obviously, the colliery owners want to mine and sell as much as possible, and have no interest in economical methods of burning. They are only concerned in the utilisation of the stuff they cannot sell.

Obviously, too, nothing can be done unless profits are made, but Government should exercise some control, and require that, though complete utilisation may be impossible under the circumstances, no avoidable waste takes place.

With the present methods of coal utilisation in vogue the preference on the part of consumers for lump, or round coal, necessitates the separation of the small, or duff coal, from the run-of-mine coal before sale. By the use of special grates, etc., a very considerable utilisation of the small coal is made for boiler firing by large power producers. Nevertheless, a considerable amount remains at present unused, and goes to the colliery dumps, and it is this dump coal to which the Imperial Institute report of 21st January, 1919, refers.

The report indicates three methods by which such dump coal may, in certain circumstances, be utilised.

(1) Burning for production of electrical power.

(2) Briquetting the coal.

(3 Carbonisation.

(To be continued.)

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[*] See Coal: Its Value as a Raw Material for Distillation Products. By Prof. J. A. Wilkinson. "Journal of Industries," December, 1918; January-March, 1919.

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'Southads."

The New Campaign Against Miner's Phthisis.

"SAFETY FIRST" METHODS TO BE INITIATED—PHYSICAL CULTURE AND DUST DETERMINATION—RESEARCH AND "COOLING POWER."

Perhaps the most practical part of the report of the Miners' Phthisis Commission is that in which it deals with measures for the eradication of the evil on the mines. It agrees that "the great want in the mines is not to have the air more chemically pure, but to get more 'cooling power.'"

The Miners' Phthisis Commission in its report states that it notes with pleasure that it is proposed to institute a regular campaign for the eradication of miners' phthisis on similar lines to the "safety first" campaign which has met with considerable success in the reduction of the accident rate in the mines. Thus the fatal accident rate was 4·21 per 1,000 in 1910, and has steadily declined since; it was 3·81 in 1913 when the Prevention of Accidents Committee began the "safety first" campaign, and for the last year has created a new continuous record by coming down to 2·43. As compared with the rate for 1910 this reduction amounts to an annual saving of 346 lives. Whilst not attributing this reduction solely to the effects of the "safety first" campaign, the Commission has no doubt that this campaign has contributed materially towards the satisfactory result and is of opinion that a similar campaign started in connection with miners' phthisis may confidently be expected to meet with similar success. In this connection they wish to refer to the remarks of Mr. A. J. Pretorius, of the Mines Department, in a report on a systematic inspection of the Van Ryn Deep Gold Mine (Government Mining Engineer's Report for 1919, page 127) to the effect that "There appears to be a great lack of sound knowledge of the requirements of phthisis and health regulations, throughout the mine on the part of all underground employees of all ranks, and this is probably the case on all mines. A series of lectures for underground workers on miners' phthisis, illustrating the cause and its effect, and organised through the men's unions would go a long way towards removing the evil. The educational side of the matter should not be any longer postponed." The Commission concurs in the view that further efforts should be made to educate the mine workers to dangers attendant on the production of dust, and is much impressed by the possibility in this direction revealed by the film, referred to above, which represents one of the lines adopted in the new campaign.

Physical Culture.

Physical culture as a means of combating the contraction of miners' phthisis has in the past received some attention; and the report of Drs. Watkins-Pitchford, Irvine, Aitken and Orenstein, under whose supervision an experiment was carried out on behalf of the Accidents Prevention Committee, was so encouraging that a physical culture campaign was started on the mines under the auspices of the Rand Mutual Assurance Company. To begin with the scheme was afforded enthusiastic support, but interest amongst the mine employees died out after some months and the campaign was dropped. The company proposes, however, to re-introduce the scheme when a favourable opportunity arises. The Commission believes there is a certain amount of risk in excessive physical culture to persons suffering from silicosis or closed tuberculosis, and this might to some extent account for the loss of interest shown, but as a preventative against contracting silicosis or tuberculosis physical culture is all to the good and steps should be taken to revive it.

Methods of Dust Determination.

One further matter calls for attention. The importance of a reliable or reliable methods of dust determination is indisputable, and the Commission notes with regret that a serious difference of opinion has arisen between the Mines Department and the Chamber of Mines Standing Committee on Dust Sampling as to the relative merits of the gravimetric or sugar-tube and konimeter methods of dust determination. A considerable amount of evidence on this question has been laid before the Commission. At this stage of inquiries, however, the Commission does not deem it necessary to express an opinion upon the relative or respective merits of the two systems, merely contenting itself with observing that the case for the sugar-tube method is not as weak as some of the arguments of its more enthusiastic advocates would lead one to suppose.

The Commission understands that effect is being given to these suggestions. If the standardised konimeter gives satisfactory results in the opinion of both parties there will be no necessity for the Commission to take this aspect of the matter further. Apart from this there are other considerations which make it advisable for the Commission to abstain from reporting more fully on these questions at the present time.

Further Investigation and Research.

An important stage has been reached in the combating of the dust on scheduled mines, a stage at which it appears that some authorities are inclining to the view that owing to the ever increasing depth of the mine workings and a number of other factors the use of water for dust laying is nearing the limit of its effectiveness and that therefore additional methods, amongst which ventilation ranks foremost, will have to be relied upon for further progress in this direction. This view is held amongst others by Dr. Mavrogordato, Research Fellow, South African Institute for Medical Research, who in his evidence before the Commission, lays particular stress upon dust distribution, and points out (and in our opinion with justice) that the places of danger are the places where men congregate and work, and that if it be impossible to blow all the dust right out of the mine by ventilation, it is essential that it should be carried away from the working faces and dissipated. The carbon dioxide standard for determining the purity of the air is in the opinion of many a failure, and some of the foremost medical and technical men on the Rand are at present examining the possibility of introducing a new standard based on the use of the katathermometer. This is an instrument designed by Professor Leonard Hill to measure the "cooling power" of the atmosphere. Professor Leonard Hill, following in the footsteps of Professor Flugge and others, has in recent years conducted a series of experiments to prove that the old ideas about the evil effects of the impoverishment of oxygen and excess of carbon dioxide in closed rooms can no longer be maintained, and lays stress on the importance of the temperature and movement of the atmosphere as well as the amount of water vapour contained in it. In a report on ventilation and the effect of open air and wind on the respiratory metabolism, presented to the Local Government Board on public health and medical subjects (Great Britain), he points out that oxygen in the most crowded room is never diminished by more than one per cent. and that such a diminution has no physiological effect. He maintains that analysis show that in a confined atmosphere the amount of CO_2 never rises to any great extent and furthermore physiological inquiry proves that the excess in the atmosphere cannot enter the body. In emphasizing the importance of these facts Mr. J. H. Ireland, a testing and investigating engineer for His Majesty's Office of Works in London, in his evidence before the Commission, states, at page 1000: "The great want in the mines is not to have the air more chemically pure, but to get more 'cooling power.' To illustrate my meaning, until recent years it was generally thought that ventilation should be regulated by the amount of CO_2 in the air. Now it is shown that quantities of carbon-dioxide in the air, vastly beyond those which were formerly reckoned good practice, cause no material strain upon the body. All the old ventilation standards usually say that air in a room, a hall, or any living places, should not have a content of carbon dioxide exceeding about 5 parts in 10,000 over outside air, which means that if outside air has, say, about 4 parts in 10,000 (which is a rough average) the percentage of CO_2 would be somewhere about ·09 per cent."

"It has been shown that percentages of 1 per cent. or 100 parts in 10,000 are quite innocuous, and certainly I should say that even up to 2 per cent. and 2½ per cent. causes very much less physical strain than the strain on the body required in keeping itself cool under hot conditions." And again, at page 1003, he says: "I think if cooling power is a necessary factor, that those who have charge of the ventilation schemes ought to be educated up in these principles, and ought to make them the aim. Tests should be taken in all parts of the mines and recorded, the progress or otherwise noted down, and the conditions regulated by the values of cooling power," and at page 1021, "I think the katathermometer is an instrument no mine should be without." Although it would be premature to venture an opinion as to the success likely to be attendant on the efforts to establish new standards of ventilation, it is clear that an interesting period of research is at present being experienced on the Rand and a further field of inquiry opened up. Again, the publicity given to the proceedings of the Commission in the public press has roused widespread interest which is reflected in improvements in underground conditions and the encouraging of investigations and research. The Commission believes that by fostering co-operation between the various bodies engaged on such work, it will not only be in a position to frame a fuller report on the steps taken for the prevention of the disease, but will also be able to express an opinion based on a further inquiry as to improvements necessary for the eradication of the disease.

Bechuanaland Exploration.

The report of Bechuanaland Exploration Company for the year ended 31st March, 1921, states that shares held in other companies at that date amounted to £178,9[illegible]. A sum of £70,135 has been received in dividends and profit on shares sold. Following is a summary of assets as at 31st March, 1921:—Stands and buildings at Bulawayo, book cost, £17,238; at Broken Hill, £10,527; cattle, £18,877; land, including improvements, etc., £[illegible]4,066; quoted shares, debentures, etc., £159,777; unquoted, stimated, £41,658; Government stocks, £35,410; cash, £54,644—total, £372,198. After providing £40,489 for development and depreciation, net profit is £[illegible], which added to the amount brought forward makes £37,405. Directors recommend a dividend of 8⅓ per cent. (10d. per share), less tax, for the year.

South African Breweries.

The report for the year ended March 31 last states that during the first eight months trade was good, but later the universal depression set in throughout South Africa, and trade suffered. The labour difficulties which arose in this country during the period were experienced in South Africa in full force, but, fortunately, the whole position has recently become less acute. The Union Glass Co., Ltd., in which the company hold a controlling interest, completed its factory at Dundee (Natal) during the year. Profits, after making provision for depreciation, amount to £241,150, and £67,536 was brought in, making £308,636. After providing for depreciation in securities, cost of remittances, etc., there remains a balance of £148,593. Final dividends of 2½ per cent. on preference shares, less tax, and 1s. 3d. per share on the ordinary shares, free of tax, balance of £33,098 carried forward.

Companies in Liquidation.

The following companies have been placed in liquidation: Lanes Transvaal and Rhodesia, Ltd.; Blane Witkop Zinc Company, Ltd.; C. & H. Gold Mining Company, Ltd.; The Cash Stores (Pretoria Gardens), Ltd.; Union Board of Executors and Trust Company, Ltd. (Foreign); Anglo-African Diamond Corporation, Ltd. (Foreign); Trent Potteries (S.A.),; Percy Diamonds, Ltd. (Foreign); Sunray Products (S.A.), Ltd.; Duffus Brothers, Ltd.; Slotar & Sons (Port Elizabeth), Ltd.; De Vaalrivier Dorschmachine Maatschappy, Beperkt; The Union Tin Mines (Roodeval Olifants River), Ltd.; Carter Brothers & Company, Ltd.; E. Trundell & Company, Ltd.; Bhikha & Nana, Ltd.; S.A. Emmola Company, Ltd.; J. R. Macduff & Company, Ltd.; Myforres Diamonds, Ltd. (Foreign); The Union Boot Factory, Ltd.; The Southern Sea Salvage Company, Ltd.; Armstrong Concretes, Ltd.; Rand Basket and Wicker Works, Ltd.; Davis Pillow and Mattress Factory, Ltd.; Scott's Jams, Ltd.; Bailie & Martin, Ltd.

Cornelia Colliery, Vereeniging. A full report of the proceedings at the annual meeting of Vereeniging Estates appears in this issue.

The General Mining Year

INCREASED PROFITS, BUT HEAVY DEPRECIATION.

The annual meeting of the General Mining and Finance Corporation will be held on the 25th inst. From the annual report for 1920, issued in advance of the meeting, we learn that the working profit for the year ended 31st December, 1920, after deducting administration expenses, etc., amounted to £81,618 0s. 1d. From this, however, it was necessary to write off losses in respect of Foreign Exchange, Mining Ventures and Bad Debts, £17,704 13s. 3d., and to provide additional reserve against possible loss in respect of Sundry Debtors £10,000 0s. 0d., making together £27,704 13s. 3d., and leaving a balance (being profit for the year) carried to balance-sheet of £53,913 6s. 10d. To this must be added the unappropriated profit brought forward from the previous year, making a total credit to Appropriation Account of £133,701 10s. 5d. The Corporation's holdings of shares and debentures show a depreciation in the aggregate of £1,189,744 3s. 3d. if taken at the market prices obtaining at 31st December, 1920, as compared with a depreciation of £1,066,100 9s. 11d. at the close of the previous year. The Directors desire again to point out that this depreciation does not represent a realised loss, but that any material improvement is largely contingent on the re-financing of certain of the companies under the Corporation's control in which it holds large interests and which require additional working capital for the re-commencement and continued prosecution of mining operations. The major portion of the share and debenture investments is in the ten mines under the management and control of the Corporation. Figures from the profit and loss account, giving the result of the 1920 operations and those for the preceding two years, are as follow:—

	1918.	1919.	1920.
Profit on shares, &c., realised...	£11,323	£17,798	£44,673
Dividends, &c.	44,049	42,241	59,460
Year's income	55,372	60,039	104,133
Year's balance	25,434	5,116	53,913
Brought in	49,238	74,672	79,788
Carry forward	£74,672	£79,788	£133,701

As will be seen the past year's balance was a great improvement upon that for 1919, enabling the appropriation account, to which the net profits are transferred, to show a reserve equal to over 7 per cent. upon the issued capital, though the very heavy depreciation in stocks and shares held requires the entire sum to be kept in hand. Total assets in the balance-sheet have increased by about £65,000, to £2,497,476, and, as the following table will show, the general position has improved during the year:—

Cr.	1918.	1919.	1920.
Stocks and shares at or under cost	£1,441,228	£1,488,540	£1,551,576
Debentures...	304,430	306,878	305,346
Total...	1,745,658	1,795,418	1,856,922
Depreciation	1,106,196	1,066,100	1,189,744
Sundry debtors	228,069	381,470	352,821
Cash	162,861	46,319	88,686
Total assets	2,404,757	2,431,959	2,497,476
Dr.			
Sundry creditors	361,263	378,679	371,594

It is to be observed that at the date of the balance-sheet the Corporation's holdings show a still further depreciation of over £120,000 compared with the preceding year, though doubtless a proportion of this will eventually be recovered.

Transvaal Silver.

The report states:—Prospecting operations having indicated good values on the sub-outcrop of the Main Lode of Dwarsfontein over a considerable distance on the strike, the work of re-opening the old shaft of the Transvaal Silver Mines, and of sinking a second shaft — approximately 3,000 feet to the east — was put in hand during the year, and an active policy of development is being carried out from both shafts. At the end of March ore fully and partially developed on this lode totalled 124,000 tons, of which 67,439 tons was fully developed, assaying 11 per cent. lead and 10.5 standard ounces of silver per ton, the intrinsic value per ton (without sorting) being 75s. 6d. Ore not yet valued, 54,500 tons. Prospecting has exposed the sub-outcrop of the East, Spies, Le Grange, and New Lodes over a considerable distance. In view of satisfactory indications by surface trenching over 5,000 feet on the strike of lode at Brakfontein, the old shaft of the Brakfontein Mine is now being re-opened and re-equipped with the object of commencing development. Prospecting operations on selected portions of the vast area over which the Company holds mineral rights have been carried out during the past year and resulted in the discovery of mineral occurrences, which will be tested in depth as opportunity presents itself. In view of satisfactory development results on the Main Lode, orders for the first unit of the Concentrating and Smelting Plant have been placed, and the electric power plant, converters and blast furnace have arrived and are being erected. It is hoped to commence smelting with hand-picked ore towards the end of July and that the Concentration Plant will be in operation by about the end of October next. The first unit of the new plant should be capable of producing 750 tons of bullion per month, when working to full capacity.

Shares are also held by the Corporation in other mining, estate, financial and miscellaneous Companies; the book value of these at 31st December last was £296,708. The Corporation holds various mining properties, real estate and house property standing in the balance-sheet at £176,612; the reserve account against possible loss in this connection remains at £55,425.

The Gold Mining Industry.

The operations of Rand gold producing companies are still hampered by excessive working expenditure, average working costs of this group of mines having risen from 21.43s. per ton milled in 1919 to 24.67s. in 1920, chiefly due to increased white wages, higher prices of certain classes of stores and increase in the amount levied under the new Miners' Phthisis Compensation Act. The recovery in the price of gold from July onwards until the end of 1920 enabled the low-grade mines to wipe out the losses made in the earlier part of the year and show a small balance of working profit for the full period. Since the beginning of the year the position has again become critical owing to a considerable drop in the price of gold, and for this reason, and due also to the fact that the cost of living has fallen, the Chamber of Mines has approached the unions with the object of securing a reduction of white wages, which, if agreed to, will in some degree alleviate the position. The prospects of the latest venture—the Transvaal Silver and Base Metals, Limited—are distinctly promising, and this Company may prove to be the pioneer of a new and successful industry by which the whole country as well as shareholders will benefit.

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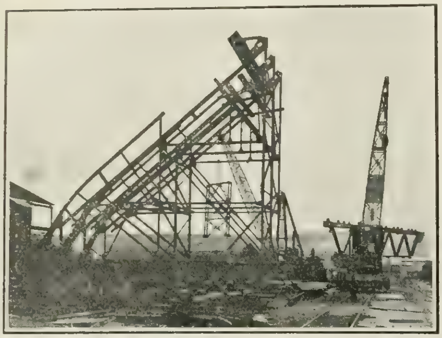

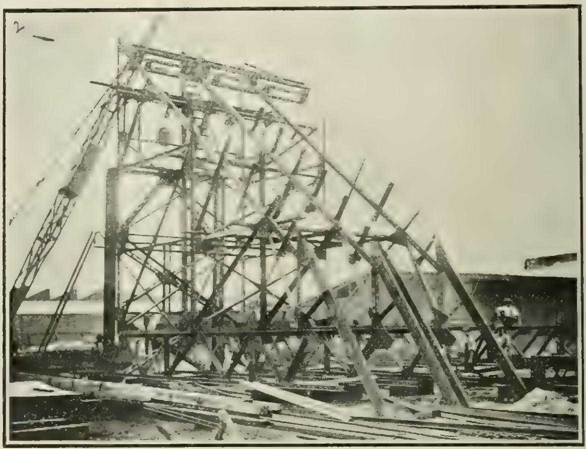

Illustrations show part of an incline gantry for the Delagoa Bay Coaling Plant, under Construction.

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EDITORIAL.

MINES, INDUSTRIES AND COMMERCE.

The new President of the Transvaal Manufacturers' Association, Mr. Serocold Skeels, is to be congratulated on his success in galvanizing that body into life, and investing its annual meeting with unusual interest and importance. Some extracts from Mr. Skeels's address will be found in this issue, from which it will be seen that he turned the occasion to advantage by dealing frankly and forcibly with the position of the Transvaal manufacturers *vis-a-vis* the Government on the one hand and the merchant distributor on the other. The presence of Mr. Malan and Mr. Warington Smyth, representing the Government, and of the President and Vice-President of the Johannesburg Chamber of Commerce, representing the distributors, ensured attention to Mr. Skeels's views from the proper quarters; and, as Mr. Malan remarked, "it seems a pity that meetings of this nature are not more frequently held," as they would prove of the utmost value to all concerned. If we may attempt to summarise what was in itself a very concise and highly concentrated statement of the case for the local manufacturer, Mr. Skeels's address may be said to join issue with the Government in point of its customs policy and its railway rates, and with organised commerce because of its lack of sympathy with the local product. The last-named grievance, as several speakers at the meeting pointed out, is more apparent than real, inasmuch as many merchants are themselves interested in local industries, and when the quality of the South African article is levelled up with that of the imported they will wholeheartedly push the local product. Indeed, Mr. F. C. Sturrock, the Vice-President of the Chamber of Commerce, declared that he had lost more money in unsuccessful local industries than he had made in commerce, and his case is typical of many. Commerce, we believe, can be trusted to take the long view, which is also the patriotic view, and to do the right thing by the local article, when the latter has "made good" in the admittedly jaundiced eye of the importer.

The real grievance of the industrialists is, of course, against the railways and, to a less extent, against the Customs tariff. Mr. Skeels declares the latter is merely a hotch-potch of pre-Union tariffs, and based upon no considered policy. To this Mr. Malan replies by citing his latest creation, the Trade and Industries Board, to which will be relegated the task of advising the Government on Customs as well as other industrial questions. To this Board he pleads that a fair trial be given, and he promises that its imperfections, as and when revealed in practice, will be promptly remedied. Railway rates, it appears, will also fall within the jurisdiction of the new Board, but it remains to be seen how far its authority and influence will prove effective with the railway administration, which has hitherto proved itself the main stumbling-block in the path of Transvaal industrial development. Mr. Skeels was very definite in his indictment of the railways, and the Minister was equally vague in his defence, so that this phase of the State's attitude towards local industries remains unsatisfactory. We have seen how the coal, the cement, and innumerable smaller industrial activities have been cramped and stultified by the reactionary policy of our railways in the past. It is not too much to say that with that policy lies the industrial future of the Province, and the success of Mr. Malan's new Board will mainly be decided by its efficacy in dealing with the anomalies in the railway attitude towards industries.

If sympathy and good advice are taken as the criteria, Mr. Malan's speech was certainly full of encouragement for the local manufacturer. His parting injunction to "improve, expand and advertise" could hardly be bettered, and with Mr. Skeels, we believe that the adoption of a common South African trade mark and of a co-operative advertising scheme will go far to remove the last vestiges of prejudice against the local product. No doubt the Minister is right in advising the local industrialist to look beyond and outside of the gold mining industry for his market. But that industry must, in the nature of things, long remain the chief consumer for local products, primary and secondary; and we would have welcomed some indication from the Minister that the Government appreciated its responsibility to encourage the expansion of mining and the prolongation of the lives of the gold producers as much in the interests of local manufacturers as of the general trade and revenue of the Union. It cannot too often be reiterated that on the gold mining industry most, if not all, our minor industries depend, and their futures are inseparably bound up together. Put in another way, the most effective support the Government can render the local manufacturer in the Transvaal is to develop, "expand and improve" mining, our main primary industry, to the full limit of its possibilities. And it can do this by remitting taxation and claim licences; by relaxing red-tape restrictions and regulations; by extending the field and increasing the reward for the prospector and the pioneer of our foremost industry.

Notes & News.

S.A. Nickel and Talc.

The Scotia Talc Co., Ltd., having increased its capital, has now changed its name to S.A. Nickel and Talc Mines, Ltd. The company will develop its promising nickel and talc occurrences in the Barberton district.

* * * *

A New Industrial Enterprise.

It is reported that Messrs. Armstrong, Main & Co., a subsidiary controlled by Messrs. Armstrong, Whitworth & Co., have acquired 12 acres of ground in Germiston for the purpose of erecting large engineering works.

* * * *

Temporary Slump in Chrome.

The chrome mines at Selukwe, controlled by the Bechuanaland Exploration Co., Ltd., have closed down for a time owing to the state of the markets and to the large amount—estimated at 25,000 tons—awaiting shipment at Beira.

* * * *

U.S.A. Diamond Purchases.

It is reported that the United States, after a prolonged abstention from serious purchases, is now again in the market for diamonds, and the story goes that one of her first purchases has been a parcel of South-West African stones. It is a well-known fact that leading African enterprises sell their stones through the Diamond Syndicate, and all the members are rigorously bound down as to the proportions which they may supply for any particular period. It will, at best, probably be some time before the Diamond Syndicate is able to dispose of its existing stocks and grant permission for new supplies to come forward.

* * * *

Vereeniging Estates.

Attention is drawn to the appearance of the report of this company for the year ending December 31, 1920, elsewhere in this issue. The growing prosperity of the company is recorded: the gross profit for the year under review amounted to £55,639 13s. 7d., as compared with £46,774 13s. 11d. for the year 1919. Among the farming ventures cattle breeding appears to be the most profitable. The increases for last year exceeded all previous years. The works of the Vereeniging Brick and Tile Co., Ltd., continue to make good profits, and the excellence of manufacture for which this company has long held a reputation is still maintained. The Union Steel Corporation also had a most successful year, and the coal interests of the Vereeniging Estates exhibit continued progress and expansion.

* * * *

Taxation of Diamond Mining.

Sir David Harris voiced the grievance of the diamond mining companies against the increased Union taxation at Kimberley last week. The experience of the New Jagersfontein Company was that before Union they paid a dividend tax of 7 per cent. only, which was increased to 10 per cent. in 1911; and in 1918 there was a further increase of 5 per cent. normal and 7½ per cent. dividend taxes. In addition, the export duty on diamonds was raised from a half per cent. to 5 per cent. in 1917, and to 10 per cent. in 1919; and during the last session of Parliament the normal tax was increased from 5 per cent. to 7½ per cent. At a low computation, the export duty now absorbs 20 per cent. of the profits, so that the State derives at least 35 per cent. of the net profits. This method of burdening the diamond mining industry is a distinct discouragement to industrial development, and may even in ordinary times have the effect of lowering wages and creating unemployment. As Sir David Harris put it, a Parliament actuated by political considerations in framing its taxation measures, instead of distributing the burdens evenly and reasonably, so that all industries pay their fair and just proportion only, must inevitably drive capital away.

Francois Cementation.

The Francois Cementation Co., Ltd. (incorporated in England) has been formed to carry out the process of cementation, the object of which is to overcome the difficulties created by water-bearing fissures which are encountered in mining, and to reduce the expense of constructing dams and reservoirs by providing means for the easy and permanent solidification of weak and porous strata upon which the reservoir walls may require to be built. Also for the solidification of unsatisfactory foundations, either of buildings or machinery. The Technical Manager is Dr. G. A. Voskule, M.A., Ph.D., B.Sc. The local Secretaries are Messrs. C. L. Anderson & Co. The capital is £750,000, divided into 250,000 non-Cumulative 10 per cent. non-Preference Shares of £1 each and 500,000 Ordinary Shares of £1 each.

* * * *

Transvaal Silvers.

Further developments have been recorded at the Transvaal Silvers. The following cablegram has been dispatched to their London offices:—"Brakfontein workings unwatered and lodes exposed; first level sampled distance 130 feet of which 70 feet is payable, containing 12 per cent. lead and 12.6 ounces silver, value 97s. 10d. per ton." The Brakfontein workings are separated from the main workings by a distance of a few miles, and the plant erected there was used mainly for dewatering the old workings. According to the cablegram the first level has been made accessible and proved to contain payable ore. The surface indications of the lode in this neighbourhood are very promising, and this fact is emphasised by the high values found in the first level. The outcrop of the Brakfontein lode has been proved for a distance of 5,000 feet, giving scope for development over considerable areas.

* * * *

Industrial Hygiene.

At the Congress of the S.A. Federated Chamber of Industries, Mr. Hugh Fowler, Deputy Chief Factory Inspector, read a paper on Industrial Hygiene. In the course of his remarks the speaker said:—The industrial history of South Africa hitherto has only been bound up in mining, and it is an irrefutable fact that the study and application of industrial hygiene, which has taken place in regard to this industry in recent years, would have saved hundreds of lives and thousands of pounds, if it had been inaugurated in its present intensive manner in the initial stages of the industry. The speaker then proceeded to apply the lesson of the mining industry to those others which are rapidly springing up in our midst. He urged that the vital statistics of the country should be subjected to critical consideration with reference to correlation of the occupations of the deceased and the causes of death. If necessary, legislation should be enacted making it mandatory upon attending medical officers to fill in the death certificates with not only the industry in which the deceased was employed, but the actual occupation followed at death. Some of the factors which might produce industrial loss were: (1) Bad housing; (2) poor food; (3) ill arranged hours of work and rest; (4) atmospheric environment of workshops. There were already signs of congested industrial areas in this country, where the housing accommodation was inadequate, insanitary, and conducive to all the disabilities experienced in other countries. The speaker cited facts to show that the need for welfare work is urgent, and he appealed for the co-operation of this Chamber in carrying out this work. Welfare work and industrial hygiene are no longer in the experimental stages (he added in conclusion). South Africa has the experience of the whole world to draw on, and if every individual manufacturer will realise that these matters are just as important to his industry as the cost of production, then there is no fear that this country of ours will have to combat against the physical and mental degeneracy of its industrial population. To the extent that life and health in industry are conserved, and the workers protected against unnecessary health hazards of accidents and diseases, the State and the industries advance their interests by promoting the welfare of those, who, by their labour, create all that is essential to the well-being, the happiness, and the prosperity of the country.

Trade Commissioners and Disputes.

Three years ago the Association of British Chambers of Commerce informed the Department of Overseas Trade that the commercial community of the United Kingdom would welcome the grant of powers to British Trade Commissioners to appoint experts to examine consignments in respect of which a dispute had arisen, and to certify the report made by the expert as authentic. At that time it was proposed that the Trade Commsisioners should only exercise this right at the request of both parties to the dispute, and instructions were eventually issued on these lines. A letter has now been received by the Association from the Department of Overseas Trade (states *The Times* Trade Supplement) suggesting that Trade Commissioners should be authorised, when approached by a local firm, to act without obtaining the consent of the United Kingdom firm. This suggestion originated with Mr. G. W. Wickham, Senior Trade Commissioner in South Africa. Cases occur in which there is some difficulty or delay in obtaining the consent of the United Kingdom firm, and Mr. Wickham is of opinion that the modification of the existing instructions suggested by him would be likely to lead to an increased number of disputes being settled without recourse to litigation, and that the prompter settlement which would be thereby arrived at would be to the benefit of British trade. In asking for the observations of the Association of British Chambers of Commerce on this proposal, the Department of Overseas Trade points out that where this procedure was followed the complainant would have to undertake liability for expenses incurred.

* * * *

Rhodesia Broken Hill.

Although the average price obtained for lead by the company during the past year is not mentioned in the annual report, the revenue from the sales of the metal amounted to £461,677, in comparison with £366,851 for ten months ended December, 1919. At the same time there was lead in transit and at the mine at cost valued at £25,205, in contrast with £22,485. The production was on a rather larger scale, for as against the 33,084 tons of ore smelted, producing 11,213 tons of lead in 1919, has to be set 42,806 tons, producing 14,602 tons of lead, last year. Expenses, however, advanced very considerably. Spreading the mine items into working expenses and shipping expenses, the following is the comparison:—Working expenses, 1919, £113,464; 1920 ,£191,202. Shipping expenses, 1919, £125,957; 1920, £154,161. Under these two main heads, therefore, the outgoings have risen during the twelve months from £239,421 to £345,363. As a result, and allowing for an increased royalty and a larger sum written off for depreciation, the net profit works out at slightly under £90,000, as compared with £100,889. The dividend of 10 per cent. is repeated. It is interesting to note that whereas in the 1919 report there were references to the installation of powerful pumps, the present document states that it has been demonstrated by the adoption of the cementation process that shafts can be successfully sunk through the water-bearing dolomite country. The water, then, which appeared at one time to be almost an insuperable obstacle, no longer presents any problems, and for the Rhodesia Broken Hill this means a good deal. In preparation for the treatment of the extensive deposits of high-grade zinc ore, a considerable amount of laboratory work has been done, and an experimental electrolytic plant is in operation.

* * * * *

Standard Bank Report.

It is not possible to make a precise comparison of the figures shown in the latest report of the Standard Bank with those in the preceding one, for, whereas the previous yearly accounts were made up to December 31, 1919, those now issued cover the 15 months from January 1, 1920, to March 31 last. Net profits for the latter period amount to £759,377, as against £634,074 for 1919, and, with the balance brought in, the available sum for disposal is £136,565 more at £969,823. The dividend, together with the customary bonus, is again at the rate of 16½ per cent. per annum, but the amount involved in the distribution is considerably larger this time owing to an increase of £666,665 in the issued capital, which amount ranked for dividend after the first six months of last year. Investment depreciation required an allocation of £200,000, as against only £75,000 in the previous account; £100,000, as against £40,000, has been added to officers' pension fund; and the balance carried forward is nearly £4,000 less at £206,724. There is now no corresponding item to an appropriation in the 1919 accounts of £200,000 for an exchange reserve account as provision towards meeting the loss in shipping gold to South Africa. Nothing is placed to reserve, which fund, however, appears in the balance sheet at £2,893,335—an increase of £693,335. Notes in circulation show an expansion of £736,463 at £4,609,342, and the deposit, current and other accounts are up £4,661,021 at £57,285,172. Drafts outstanding and acceptances are £887,918 lower at £1,360,918, and customers' bills for collection figure at £9,081,548, an increase of £1,832,601. The liquid position of the bank's resources is somewhat improved, for while cash is £123,975 up at £10,221,078, remittances *in transitu* and native gold on hand are £298,939 higher at £2,252,264, while investments have been enlarged by £583,062 to £5,266,252. A noteworthy feature of the account is a rise of £8,105,153 to £42,191,093 in the total of bills discounted and advances to customers.

* * * *

German Trade Competition.

German competition is making itself increasingly felt in South African trade. We note that Lord Sheffield, writing to the Press, insists that it is not the depreciation of the mark in comparison with gold, but rather the greatly increased cost of production in countries outside Germany, which has helped Germany to revive its industrial and commercial activity. The Bradbury is depreciated in terms of gold by about 20 per cent., so we must add a quarter to the English quotation of the mark, which brings the average to 288 marks instead of 20 marks to the gold pound. Thus the mark appears to have depreciated as compared with the pre-War gold value to between one-fourteenth and one-fifteenth of its value in 1913. The *Frankfurter's* table of internal prices showed an average increase of rather more than 1,500 per cent., which corresponds very closely with the paper mark's relation to the pre-War gold mark. Lord Sheffield refers to the report (Cmd. 1,114) on the industrial and economic position in Germany in December, 1920, where he finds that in the iron trade "wage increases are estimated to represent an advance over 1913 rates of from 10 to 15 times per ton of product." But the cost of labour has not kept pace with the cost of subsistence. In the Ruhr coal mines the owners reckon the net earnings of a hewer per shift at 3.86 in gold marks, or 3s. 10d., to which the Government add an allowance of about 3½d. In the proposed scale for Berlin municipal gas workers, the maximum is under 20,000 marks, which, when reduced to gold value, is less than £72 per year. In machine industries and similar works the maximum pay was seven marks an hour, or about 6d. Lord Sheffield concludes "that the purchasing power of the depreciated mark is not greater in relation to articles than the purchasing power of pre-War mark on a gold basis." But, as Mr. McKenna has pointed out, the War has left the German working man in a far worse condition than he occupied in 1914, owing to his failure to obtain increased wages proportionate to the depreciation. If Germany is able to undersell Great Britain in the markets of the world, that is due, Lord Sheffield thinks, to three causes: (1) To superior skill and energy on the directorate, as in the production of chemicals and dyes; (2) to more resolute and persistent industry on the part of the workers, whose output per head is not allowed to slacken and (3) to the acceptance by the German worker of a lower standard of living as the result of the general impoverishment of the War, as contrasted with the proclaimed determination of British organised trades not to be content even with pre-War conditions, but to demand a higher standard of comfort and enjoyment, with a diminished demand on them for labour and production.

THE BUSY MAN'S PAGE.

What to Read in the Technical Press.

Mining

Reliability of Rock Drill Steel in Service.—Iron and Coal Trades Review, July 22, p. 106.

The Cooling Effect of the Ventilating Current.—The Colliery Guardian, July 22, p. 235.

Unwatering the Mines of the North of France.—The Colliery Guardian, July 22, p. 237.

Training for Foreign Exploration.—Mining and Scientific Press, July 9, p. 55

Mining Activities Near San Luis Potosi, Mexico.—Mining and Scientific Press, July 9, p. 61.

Coal and Fuel.

Coke Breeze Mixtures for Steaming, I.—Coal Trade Journal, July 13, p. 817.

Gas Coal Supplies During the Stoppage.—The Colliery Guardian, July 22, p. 238.

The Chemistry of Combustion.—The Colliery Guardian, July 22, p. 236.

Continental Notes.—The Colliery Guardian, July 22, p. 251

Economics.

Industrial Unrest and Organised Revolution.—Iron and Coal Trades Review, July 22, p. 108.

Labour and Wages.—The Colliery Guardian, July 22, p. 243

Conditions in Europe.—Mining and Scientific Press, July 9, p. 64.

Economic Conditions in Germany.—The Statist, July 23, p. 143.

Metallurgical and Industrial.

The Relative Values of Protective Metallic Coatings for Iron and Steel.—Iron and Coal Trades Review, July 22, p. 102.

Molybdenum.—Iron and Coal Trades Review, July 22, p. 104.

Report of Alkali Works Inspector.—Iron and Coal Trades Review, July 22, p. 95.

The Heat Treatment of Steel.—The Engineer, July 22, p. 95.

Gas-Fired Annealing Furnace.—The Iron and Coal Trades Review.

Engineering.

Effects of Scratches in Materials.—Iron and Coal Trades Review, July 22, p. 99.

The Engineering Conference.—The Engineer, July 22, p. 83.

Developments in Power Station Design.—The Engineer, July 22, p. 90.

The Reavell Quadruplex Air Compressor and Some Tests Thereon.—The Engineer, July 22, p. 98.

Boiler House Management.—The Colliery Guardian, July 22, p. 237.

A 500 Horse Power Combined Engine and Boiler.—The Engineer, July 22, p. 88.

LATEST METAL QUOTATIONS.

Cables dated London, August 12th, state:—On the London Metal Exchange to-day Standard copper closed at £69 17s. 6d. cash and £70 2s. 6d. forward; electrolytic copper at £74 10s. cash and £76 forward; Straits tin at £155 10s. cash and £156 10s. forward; English lead at £23 10s. cash and £23 2s. 6d. forward; bar silver at 37½ pence per ounce; fine gold at 112s. 1d. per ounce; and quicksilver, £10 10s

London, August 13th.—On the Metal Market during the week the prices of metals owing to reduced coal prices showed a slight improvement. The trade returns are encouraging, but at present they do not affect business, which is generally very quiet. In copper steadiness was followed by a drooping tendency owing to the absence of bona fide business. Speculative demand was almost non-existent. Early in the week tin showed strength on influential support, but reacted owing to realisations and finally on bear selling. The consumption has improved, but the supplies at present are above the demand. In lead the demand has fallen off, and spelter is quiet. Early in the week silver relapsed owing to China and India selling, but later there was a steady recovery, especially as the market is likely to lack supplies.

The Stock Exchange this week maintained firmness of prices despite paucity of business and absence of public interest in view of the uncertain aspect of European politics, but became easier, which was attributed to the less favourable monetary situation. In the absence of selling the market is now steady. There was no special feature. Oil shares were on the down grade in the absence of support. Despite the general stagnation Kaffirs maintained a cheerful disposition on the settlement of the Rand Labour dispute, together with the favourable monthly returns. Encouraging features are bringing forth increasing enquiries. Rhodesians also participated in the movement. Diamond shares were supported chiefly by the Continent on reports of improving trade.

Writing of Zimbabwe and the Land of Ophir, an American paper says: There still remains the puzzle of Ophir. Where was Ophir, whence the "gold of Ophir" came? The notion formerly entertained was that Ophir was somewhere in India. When it was proved that Southern Rhodesia was undoubtedly the source of Solomon's wealth in the yellow metal, it was assumed that the location of Ophir had at last been found. But archaeologists are now of the opinion that Ophir was a seaport on the south coast of Arabia—that it was merely an entrepot from which gold was distributed over Arabia, Palestine and Egypt. One should realise that the gold mines of Rhodesia were not worked only by King Solomon. They were operated by the Arabians (Sabaens and Himparites) for several centuries before the monarch called The Wise was born. Mining engineers, as a result of careful study of the ancient workings, have estimated that at least 400,000,000 dollars worth of gold must have been taken out of them before—rather suddenly, it would appear—they were abandoned. Solomon's share was doubtless large, judging from the plentifulness of the precious metal in Jerusalem, as described in the Bible, where, as we are told, "silver was nothing accounted of in the days of Solomon," and was "made to be as stones." We may add that there still remains the puzzle as regards what became of that gold which was so plentiful in Jerusalem. If our Hebrew friends could be persuaded that any reasonable proportion of it still remained, there would be required no further inducement to hasten their return.

Letters to the Editor.

EMERALD AND VICTORY DIAMONDS.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—Will you kindly inform me of the present position and future prospects of Victory Diamonds, Ltd., and Emerald Diamonds, Ltd.? The secretaries of both these companies are L. Charlston Goch & Co. I have written to them asking for information, my last letter being dated July 18th, but can get no reply. Many others would no doubt be thankful to you for any information you can supply.—Yours, etc.,

L. C. HODGKINS.

Durban,
August 15, 1921.

[Perhaps the secretaries will issue a statement.—Ed.]

THE PASSING OF THE STAMP MILL.

Mr. H. S. Denny's Views.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—The possibility of doing without stamps in future gold recovery treatment plants interests me very much. On more than one occasion you have been kind enough to refer to my humble efforts in the past to influence the trend of metallurgical opinion in the said direction, and it has been very gratifying to notice recently cabled statements from the Rand indicating that at last the anticipations and recommendations of nearly 20 years ago are to be realised. It probably is within your memory that in July, 1903, I ventured to discuss rather seriously and critically the metallurgical practice of the Rand of those days in a very exhaustive paper to the Chemical, Metallurgical and Mining Society. This was absolutely the first attempt to introduce tube milling to the field, and within twelve months of that date the first tube mills were running, and the subsequent developments are now a matter of history. In 1906 a joint contribution by Mr. G. A. Denny and I was presented to the South African Association of Engineers, and in that contribution many reasons were given for discarding the stamp mill and replacing it with a system of stage crushing and stage grinding. The advantages of the use of tube mills for increasing the mill capacity where they were added to an existing mill were very clearly set out, and the greater advantage of doing away with the stamp mill altogether was emphasised with all the force that we were capable of bringing to bear upon the subject. It was also suggested then that the tube mill as a grinding machine might alternatively be replaced by some cheaper and smaller unit, such as a very much improved pan grinder. Speaking from the standpoints of economy and efficiency, both in regard to capital outlay and to operating costs, advantages were claimed for the adoption of the principles promulgated. In reverting to past history, I am anxious to avoid the "I told you so" attitude, but I cannot refrain from expressing the hope that the aspirations of nearly 20 years ago are at last to be realised in the practical application of the principles then advocated. I would refer you to the profile elevation submitted with the 1906 contribution above referred to, a glance at which shows that the stamp mill was entirely cut out of the proposed scheme of stage crushing, fine grinding and filter pressing. Plants on these lines have already been successfully installed in many parts of the world, and, in fact, as far back as 1907 I had the pleasure of going over more than one plant in the United States, in which these lines were faithfully followed. There is no doubt at all that the elimination of the stamp mill and sands treatment plants by the substitution of the stage crushing and grinding principle involved in the one product process advocated in 1903, would bring into the bounds of commercial possibility many millions of tons of ore that could only be worked at a loss by existing Rand methods. Now that you have taken the matter up, I earnestly hope that you will relentlessly pursue it to the end. It is my belief that this apparently simple question is fraught with the greatest bearing on the economic future of South Africa. Thanking you in anticipation.—Yours, etc.,

H. S. DENNY.

SOUTH AFRICAN COAL ESTATES (WITBANK) LIMITED.

The report of the operations for the quarter ended June 30 is as follows:—Output, 136,178 tons; estimated profits, £15,000. Cassel Section: Landau: Underground conditions continue good. Navigation Section: Bailey shaft: Development being pushed ahead and coal opening out well inside of fault. Erection of plant nearing completion. Navigation shaft: Main shaft down 180 feet. Development proceeding from air shaft. The erection of plant and machinery is proceeding satisfactorily. Coal continues to be of excellent quality.

Leeuwpoort (African Farms) Tin Mines, Limited.

Since the curtailment of operations work has been centred on development and treatment of Vanner tailings; 2,865 tons of tailings have been treated and 2,627 tons of ore milled, resulting in the recovery of 71·1 tons concentrates of an average grade of 50·78 per cent. metallic tin. During the quarter the sum of £6,985 13s. 4d. has been spent on development, shafts, etc., and a total of 1,318 feet developed.

McCreddy Tins (Swaziland) Limited.

The output for the quarter was approximately 19·3 tons of 68 per cent. concentrates, equal to 13·124 tons metallic tin (at £168 10s. per ton), valued at £2,211 7s. 10d.; working costs, realisation, general expenses and adjustments previous shipments, £3,615 12s. 1d.; estimated loss, say, £1,404 4s. 3d.

West End Diamonds, Limited.

Test washing has been completed. The value of the mine has been conclusively proved. All energies have been concentrated on erection of permanent plant, where excellent progress is being made.

Theron Diamonds, Limited.

Mining, hauling and flooring of blue ground has been proceeded with, and a total of 22,765 loads has been floored to June 30.

Rezende Mines, Limited.

The shaft was sunk 66 feet during the quarter to a depth of 870 feet, and the development footage for the quarter amounted to 1,058 feet; total, 1,124 feet; tonnage mined, 19,143; waste sorted, 1,943 tons; tonnage milled, 17,200; total yield 7,788·84 fine ozs.; total yield per ton, 9·06 dwts.; working revenue (including premium on gold), £40,831 12s. 10d., or 47s. 5·743d. per ton milled; working costs, £24,580 12s. 6d., or 28s. 6·985d. per ton milled; working profit, £16,251 0s. 4d., or 18s. 10·758d. per ton milled; sundry revenue, £429 19s. 6d.; total profit, £16,680 19s. 10d. The native labour for the quarter was again all voluntary. Underground labourers are offering themselves more readily than in the previous quarter. Development continues to give satisfactory results.

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The Geology of Heidelberg.

MR. BLELOCH'S REPLY TO DR. ROGERS.

Mr. W. E. Bleloch has written to the Geological Society of South Africa, as follows:—

I desire to hand in as contribution to the discussion on Dr. Rogers' paper: (1) A brief reply I made in *The South African Mining Journal* to the summary of the later part of the paper which was particularly addressed to me and (2) a report of what I said at the last meeting of the Society also published in the same journal. I ask that these contributions be printed in the proceedings of the Society, and I make this request on the following grounds: (1) That a summary of the latter portion of Dr. Rogers' paper was sent to the Press either by Dr. Rogers or the Society, while the remainder of the paper was barely referred to; (2) that as Director of the Geological Survey of the Union Dr. Rogers is a public servant, and his paper is in effect a state document read with the permission and on the authority of the Rt. Hon. the Minister of Mines and Industries, and no doubt with the approval of the Government Mining Engineer. Dr. Rogers' views, no matter how correct, or incorrect, they may be, become at once under these circumstances the authoritative pronouncement of the Government on these matters. In giving evidence before the Select Committee in Parliament, the Government Mining Engineer has stated that he relies solely on the officers of the Geological Survey Department in regard to these questions, and the Rt. Hon. the Minister has said the same. There are many citizens who feel that the paper dealing not merely with an ordinary geological question, but with a great economic issue and containing as it does a direct attack on the views of those who are in agreement on one side and that the side to which Dr. Rogers is opposed, should not have been read before this Society, but should have been published as a special memoir by the Geological Survey Department. It is felt that such a paper should have been given to the public and not to a small section of the public, no matter how select and privileged that section may be. I claim therefore that seeing the council of this Society has accepted the responsibility of printing the paper, and besides circulating it among the members of the Society, has sent a portion of it to the Press for publication, must accept the duty of recording in like manner the views of those who are in disagreement with the paper and its author.

(I.)

The Lower Witwatersrand Beds.

I do not propose to deal exhaustively to-night with Dr. Rogers' conclusions relative to the lower beds of the Witwatersrand System in the Heidelberg district except to say that in my opinion his identifications of the beds of the several horizons are erroneous. My view is that the beds Dr. Rogers calls the Lower Witwatersrand Beds, that is, those inclusive of all the beds below the Main Reef series of the Central Rand extend much higher in the geological succession at Heidelberg than the line below which Dr. Rogers places the highest of these beds, and that the diagram on page 34 of his paper showing a reduction of thickness of these beds at Heidelberg as compared with the same divisions of the Witwatersrand System on the Central Rand is based on wrong premises. As I intend to deal at greater length with the fundamental and more important points of divergence, I shall not have time to-night closely to criticise Dr. Rogers' descriptions of, and conclusions, regarding these lower Witwatersrand beds, but I will, however, draw attention briefly to one or two outstanding points.

The Hospital Hill Series.

You all know the remarkable sago structure of some of the quartzites in the Hospital Hill Series. Dr. Rogers says (page 20): "This structure, which is an unusual one in sediments, is well known in the higher quartzites of the Hospital Hill Series on the Rand, and in Heidelberg is found through a greater vertical range—from below the Water Tower Slates to above the Government Reef Quartzites." He naively remarks (page 21): "The wide range of these sago quartzites in Heidelberg renders them almost useless for approximately identifying horizons in the Hospital Hill and Government Reef Series, though they are certainly more abundant in the former." The question arises, how does Dr. Rogers know positively that the beds showing sago structure which he classes as Government Reef quartzites at Heidelberg may not really belong to the upper divisions of the Hospital Hill Series. The similarity in composition and structure of these quartzites one would think should be considered as of some value as evidence that the beds in question belong to the Hospital Hill division and not to that of the Government Reef. Then again Dr. Rogers has failed to find the famous speckled bed below the shales which he identifies as the Hospital Hill Shales. The absence of this famous marker on which geologists of his school have had faith enough to remove mountains—Langerman's Kop, for instance—is surely a great discrepancy and without it how can Dr. Rogers be so positive that these shale beds are the same as the contorted shales with their very distinct marker on the Hospital Hill on the Central Rand. Dr. Rogers has described in the section more than one occurrence of highly ferruginous and magnetic shales.

Government Reef Beds.

I would remark that in particular the 1,869 feet of slates and quartzites which he brackets together in his section on page 26 as Government Reef beds do not at all present a similar section to that of the Government Reef beds as known on the Rand. The Reef which he calls the Government Reef some half-way up in the series he describes on page 24 as a small conglomerate, and cites one place where it is 14 inches thick, and says that in places there is another conglomerate 6 inches thick, separated from his Government Reef by 6 inches of quartzites. I submit that his description of the bankets reef and the quartzites and shales comprising the beds Dr. Rogers classes as the Government Reef Series would not be a good description of the beds of that series on the Rand, but would be a very good description of the banket beds quartzites and shales which exist below the Government Reef Series which are well exposed in the Krugersdorp area and especially well exposed on the farm Kleinfontein, immediately north of the town of Benoni. I think Dr. Rogers would do well to reconsider his identifications of these beds, giving due regard to the views here suggested. His words in dealing with this section of his subject indicate indecision and uncertainty. He uses words like "it is very probable" more than once, and finally uses these words (page 25): "The top of the Government Reef Series has been *drawn*," at the top of the quartzites next above the blue grits. The top of this important series as identified by Dr. Rogers is *drawn* therefore at the top of a section of beds of slates and quartzites terminating with blue grits and slates which are unknown elsewhere in the Government Reef Series and whose quartzites present the specially characteristic feature of the Hospital Hill quartzites. I do not think I go too far in saying that the section described is quite unlike the Government Reef Series either on the West or East Rand.

The Next Series.

Coming to the next series described by Dr. Rogers as the Jeppestown Series. At the base of the division of rocks he thus described he says there is a red weathering slate containing some 120 feet of quartzite and then bands of very ferruginous rock approaching the West Rand Shales in character. On the reading I have suggested that the beds of the previous division I have just dealt with may belong to horizons below the Government Reef Series, why should not these very ferruginous beds be the representatives in the Heidelberg district of the West Rand Shales? Dr. Rogers says they approach these shales in character; possibly Dr.

Rogers follows other members of his school in identifying beds as the same because they are different, and as different because they are the same. In consequence of such identifications he is compelled *to draw the top* of an important series—to use his own words—at the position where he has marked it off, regardless of whether the beds so marked off resemble the beds they are classed with or not.

The Government Reef Series.

On page 29 Dr. Rogers says the base of the Upper Witwatersrand beds is "*taken*" at the base of the Nigel Reef or the quartzites when the reef is absent? Dr. Rogers is most accommodating to this poor base, which again I submit he wrongly identifies as that of the Nigel Reef. I think he does the Nigel Reef, small and unimportant as it is, a great injustice in identifying it with the unpayable Molyneux Reet, correctly correlated by Dr. Carrick years ago as the Government Reef* He proceeds to say that "the great contrast in resistance to the weather offered by the 'Nigel' quartzites and the shale beds on which they lie makes the horizon one of the most conspicuous geological features in the district." This is quite true about the beds in question and is an admirable description of the hill range they form, but it is not true either of the Nigel Reef quartzites at other places nor the beds associated with the Main Reef Leader with which Dr. Rogers and his school identify the beds he thus describes at Heidelberg. Nowhere along the Main Reef horizon on the Rand is there a prominent range of hills whose beds show resistance to the weather like those in the Heidelberg district thus correctly described but incorrectly identified by Dr. Rogers as the Nigel beds or, as they say, the beds of the Main Reef Leader. On the contrary the Main Reef Series outcrops for thirty miles, from Boksburg to Roodepoort, along comparatively low lying ground forming in some places a veritable valley. Nor does the Nigel horizon in its indisputable position at the Nigel Mine form a prominent hill range. Dr. Rogers' description of the beds in question is certainly quite inapplicable to those of the Main Reef Leader horizon anywhere along the Rand, but I will say that it is distinctly applicable to the Government Reef horizon at Krugersdorp, and in fact everywhere on the Rand where these Government Reef quartzites occur. They do make everywhere prominent ranges showing great contrast in resistance to the weather to all the beds above them, and as a rule to those below them as well, and I submit that on Dr. Rogers' own evidence the reef which he takes for the Nigel and the quartzites which lie above it on Bothaskraal must on the contrary be identified with the Government Reef and Series and with no other. To adopt Dr. Rogers' kindly and charitable phraseology, "Here we discover a possible reason" for the thinness of Dr. Rogers' section, and the "weakness of his map." We begin to discern the causes of the wrong *tops* which he has *drawn*. Dr. Rogers may, as he states, have gone over the ground with a plane table and thus have done his mapping with plane table accuracy, but there is not much knowledge or experience in a plane table, and it seems that the net result of his mapping is to have plotted in with great accuracy—accuracy far beyond what I could ever expect to attain with the time at my disposal—the many several beds which outcrop and at the same time to have labelled them one after the other with names of beds well known in other areas of the system irrespectively of whether the beds so named on the new map are similar or dissimilar in character and sequence to those after which they are thus irrelevantly or irreverently named. In regard to these lower Witwatersrand horizons, Dr. Rogers appears to be always a few streets out. On his own evidence the quartzites he takes to be the Government Reef quartzites have the character of the Hospital Hill quartzites. His Jeppestown shales have the character of the West Rand shales and his "Main Reef Leader," the Molyneux Reef and its overlying quartzites, have the character of the Government Reef and the Government Reef quartzites.

Dr. Rogers' results, I submit, are somewhat similar to the errors of mapping which a town surveyor would make, who would put down quite correctly all the streets and main features of Johannesburg, but who would label Noord Street as Commissioner Street, and Louis Botha Avenue as the Central S.A. Railway, or who would plot down the Corner House as the Institute of Medical Research, and the Government Buildings as, say, the Jail. For the benefit of oversea members I will add that applied to London such a map might show Oxford Street as the Strand and the Houses of Parliament as Buckingham Palace.

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* In regard to the Molyneux Reef I must point out that it occupies the same stratigraphical position as the Government Reef Series . . . The goldtenour of the Molyneux Reef is also very similar to that of the Government Reef in so far that both reefs have extremely rich patches, while the main body of reef itself is decidedly poor and the average considerably less than Main Reef. —Dr. J. T. Carrick Report, August 6th, 1903.

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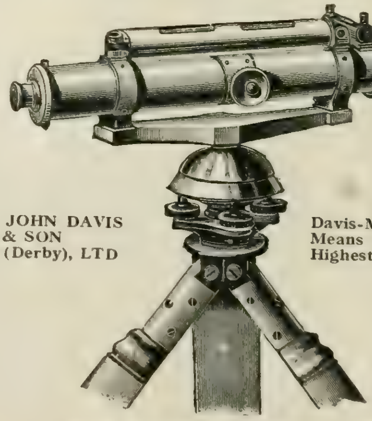

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The Beginnings of the Diamond Fields.

(By W. P. Taylor.)

In this article Mr. Taylor continues his interesting reminiscences of the earliest days of the diamond industry in South Africa. The number of those who remember those exciting times, fifty years ago, is rapidly diminishing, and Mr. Taylor is rendering a public service by putting these historic incidents on permanent record before they are forgotten.

I have described how men found themselves at the Vaal in 1870, but I should enter into the conditions of the times to more fully allow the reader to understand the true atmosphere of those days. First of all, one should understand that there were then but few diamonds in the world; most people only knew of a diamond from having read about it in the Bible; and in those days a diamond was indeed a precious stone. Unconsciously the men who trod the long trail then were to be some of the founders of all that has tended to open up the interior of this great country. South Africa was just emerging from a terrible state of financial stress. Wine, wool, produce, everything was down, and there were no oversea markets, there was no population, and no internal market. I know how deep poverty was then, for I had lived in the village of Stellenbosch, and our nights were the darkest that I ever remember. There was no electric light, no paraffin lamp, not even a sperm candle. No, our lights were dips, tallow dips and snufflers, and we bought the suet and made the candles ourselves. It is good to have lived in days of self-reliance, for with the knowledge of what that life was and how it had to be supported, one can smile at the insistence of everything to hand in these days of luxury, but there it was. Families were living on £12 a month, and house servant had to be paid out of that. Well, we did it, and it was from efforts such as these that men of every class emerged into the wonderful sunshine on the Vaal River's banks, and saw diamonds being found daily worth anything up to twenty thousand pounds. Then they went mad at the idea of making a fortune in a day.

Pioneer Names.

It was into such an atmosphere that Herbert Rhodes, with Captain Becher, Captain Paddy Rollestone, Colonel Colin Campbell, of India fame, and a Mr. Gurney arrived at Kilpdrift. Cecil Rhodes, a mere lad, was one of this party. The company had been formed in Maritzburg, and some of its members were officers that had just come with their regiment, I believe, the 20th foot. Herbert Rhodes was the first Rhodes to come to Africa. He was a great burly man, the biggest of all the Rhodes's. Truly a born adventurer, he carried venturesome blood in his veins. The party he brought up recognised him as their head. My dear old friend, Captain Becher, often told me of the wonderful dreams of Herbert Rhodes, for he was bent upon being as great a Republican as his brother Cecil was an Imperialist. He dreamt of a Republic to embrace all the interior. In later years he became a member of the old Transvaal Volksraad, but he was ever casting loose for the joys of the veld, and it was from this scene that he went to the forests of Central Africa and lost his life in a veld fire. The story told of Herbert Rhodes's death by Robert Ely, in the *Natal Witness*, is a thrilling tale, embracing the gun-running story. We had all heard of Herbert Rhodes's death by fire, and there was the tale of his having undertaken to give a native chief a cannon for a bucketful of diamonds. We heard that he made the attempt and had been fired on by the Portuguese soldiers of Delagoa Bay; that he had cast the piece overboard into the King George river, and had taken to the bush, where he got malaria. Eventually he turned up at Pilgrim's Rest. Captain Hinton, of course, was well known to us all. He was a member of the old Craven Club, and one would surmise that long ago he would have told the tale; but I never heard of Herbert Rhodes's last days until I read them recounted by Mr. Robert Ely.

A Touch of Romance.

Herbert Rhodes's party found a 44 carat stone. Captain Becher rode to the Cape and sold the stone to Charles Manuel, a merchant in produce, and out of the deal came the partnership of Merriman and Becker. A touch of romance was Captain Becher meeting Miss Chiappini, half-sister to Mrs. C. D. Rudd, whom he married and took to England, where he founded the firm of Becher and Watson, which carried on operations in diamonds and African shares. But there was Herbert Rhodes and his party tasting the first sweets of success. There were the numerous bodies of workers from all the then depressed parts of Africa facing the prospects of real wealth. Situated as they were, on the banks of a river, whose hills were full of strange wildness, meeting men who came from various parts with tales of new possibilities, can anyone doubt that men began to dream?

A Retrospect.

All my life has been fraught with optimism, for I learnt to dream in the glow of a fire as I scented fragrant sap from the burning mimosa, and heard men talk of diamonds, of gold, of dead cities a thousand miles north, buried beneath the trunks of great trees, under the shades of whose branches were the secrets of a long dead past; where gold had been a god. Drinking in all this, I became an early follower of the possible. Yet I have seen men drink themselves to death and curse their hopelessness, the faint-hearted flee from work; but I have seen the steadfast believer carry on, and the mind of a great dreamer, who, from the ironstone rocks of Klipdrift, through the sands of Kimberley and De Beers, gazing ceaselessly into the mine's dark depths, ever dreaming, and his dreams evolved. Viewing the country from the coast, the veld was still wild. There were no lions, but game was in full movement in the plains.

A Central Rand Panorama taken from the neighbourhood of the Simmer and Jack.

Veld Life.

There were the various antelopes, the gnu or wildebeeste, and the zebra or quagga, that filled the vast plains from the Drakensberg to the Kalahari Desert. Seeing a few of any species to-day, in the game as found on farms, carries no impression of what game meant in those days. Herds traversed their haunts untrammelled by wire fences. When a great movement took place it seemed as if there were interminable millions that moved in every possible stretch; the very horizon moved, for it was one world of seething movement and colour. When herds of trek springbuck moved, driven by droughts, the incessant stream poured for days and days and devastated like locusts every vestige of vegetation. The curse of this visitation caused farmers to devise every means for their destruction. At one place in Calvinia they herded the great mass of buck over cliffs and thereby destroyed countless thousands. When I travelled in the Transvaal as late as 1875 I saw one of these large herds of mixed game, and they moved on the outlines of the horizon in countless numbers.

There are still men on the river to-day that felt the first impulse of diamond digging. There are men there who have made diamonds their life study. I could mention Tom Barker, whose brother was one of the partners of Wells and Barker in 1876, from which time I have known Tom. He and Henry Cohen are of the same old times, and are perhaps the two oldest buyers on the river. These men belong to the old brigade and have seen the intense struggle of the river digger, than whom there is nothing more determined and hopeful under God's sun, and in these times of stress such men hold out a helpful hand and thereby there will always be hope for the digger.

It was through such wildness that the various parties, as they then called themselves, moved. Many of them had oxen, and took their time. Every day was filled with sport, and it was with regret, from that point of view, that their wonderful journey ended. At the river's banks were a strange people. They were yellow; the women with extraordinary figures and high cheek bones. They ejaculated numerous clicks with but few words, and their one fervent hope was Cape brandy. In the mornings strings of them would march down the one and only street with goat's milk, eggs and chickens, and the results invariably went into tobacco and Cape smoke. All along the slopes of the hills were the Koranna and Griqua huts, and some miles east was the Moravian Missionary Station of Pniel. All the time that I was at the river and at Kimberley I never heard any good of any native that came from any of the missions; in fact, at Kimberley no self-respecting digger would engage a mission boy. I did once, and within a few hours of his service he deliberately swallowed a diamond worth £100 that I, in my youthful credulity, put into his hand, so that he could see what a diamond really was like. I see him now with his great face full of expectancy, his large wide hand into which I placed the beautiful blue-white gem, and then he opened a huge cavernous mouth, threw the stone into his throat, and shouted "Oh, my little master, I have swallowed it." Of course he had, the rogue, and a more premeditated theft I have never come across in this long and varied life of mine. I got some friendly diggers to consider his future. He was dosed with calomel, tied to a waggon, escaped, and the moral of the experience was to have nothing to do with missionary boys. Well, no one at the fields troubled about the mission, though it had done its work for years, and I have been to Moravian Missions where good work undoubtedly was done, but I doubt if any ministering angel could ever have ingrained a spark of honesty into any of the specimens that were encountered in those regions. The Bechuanas that came from the north were better, and it was not very long before we got Mackaties and Shangaans, who settled down to serious work for ten shillings a week.

A Little History.

There was only one real road on each side of the river. The tents were scattered and erected wherever there was a nook, and the stores and bars were on the main road. The Government House of the three weeks Republic was a huge marque; it was Stafford Parker's bar as well, and there men congregated to carry on the deliberations that produced a British effort to counter the invasion which was being made by the Dutch to take the fields. However, nothing happened, and the long line of river gravel, from Hebron to Seven Hills, or Sevonelle, as we called it, was being rocked and cradled, diamonds were being shipped, and the European world awakened to the brilliancy and splendour of the African diamond.

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are invited and will be received by the Undersigned up to and including Saturday, 1st October, 1921, for the purchase of the **MACHINERY, PLANT, EQUIPMENT, MINE STORES, TOOLS, ETC.,** lying for disposal at the above Company's property at Vierfontein, O.F.S.

Tenders must be for the whole of the above, and the successful tenderer will be required to remove same at his own expense and risk within one month of the acceptance of the tender.

The highest or any tender not necessarily accepted.

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The Early Days of our Gold Fields.

A PIONEER'S RECOLLECTIONS.

II.

By Arthur Stenhouse.

In the pioneer days of the Witwatersrand goldfields it was a tedious journey to the shores of Table Bay, but what a relief to get away from the Golden City! Away from the goldfields, away from the bowels of the earth, where half-naked Kafirs dug and delved in the drives, stopes and winzes, like so many imps of darkness.

Upon my arrival at Capetown I obtained a special permit from the Municipality to ascend by the aerial tram from Camps Bay to the top of Table Mountain, a journey occupying but a few minutes. Once on the tableland, my thoughts naturally recurred to the late Cecil Rhodes. How often had he ridden on his pony from Groote Schuur to the hill-tops and gazed northwards across the silver valleys and over the mountain ranges. It was here that he conceived the idea of constructing a great transcontinental railway through the heart of Africa to the Mediterranean Sea, a scheme now rapidly approaching fruition. Here it was that his great ideas were conceived.

Telegraph Office in Johannesburg (Market Street) in 1887.

To-day, far from the haunts of man, amidst Nature's surroundings, above Kalk Bay, I gazed down upon the ever-restless waves of the Indian Ocean. Joyfully the sugar birds flew from tree to tree, as the brightly coloured butterflies gaily winged their way from flower to flower on the mountain slopes. How peaceful here, and what a contrast to the perpetual stamping of the never-silent batteries of the Witwatersrand mines.

Back once more to Johannesburg, now no longer a mining camp of universal brotherhood; no longer occupied by men who thoroughly realised and fully realised the true definition of happiness—" the art of making others happy,"—and although to-day Johannesburg is a bustling city with its palatial hotels, numberless motor cars, and all the adjuncts of modern civilisation, we miss the helpful spirit and the good comradeship of those days of long ago.

Here in the full-grown city we recollect the days when the late Paddy Green, in his canvas tent, combined the offices of medical man, amateur postmaster, and saloon keeper! At this tent prospectors assembled to discuss optimistically the future fabulous wealth of their claims; to collect their mail; to imbibe some liquid refreshment! Dr. Grant's popularity was universal, and entertaining were the racy anecdotes told in the shadow of his residence.

We are told that our lives are what we choose to make them. But is this true? Or is it a fallacy? Where are now the castles we built in the pioneer days? A few of our dreams have materialised, but the majority of the pioneers have gone to another sphere, their ambitions unfulfilled! There are still some of the " early birds " here to-day, viz., Sir J. B. Robinson, Henry Nourse, R. R. Hollins, Billy Ross, and others; but surely our days are numbered; and is it not time that we " old stagers " trimmed our sails and prepared to shed our mortal coils, preparatory to taking our aerial flight through illimitable space to Paradise?

The old or first " Corner House," on the site where the present sky-scraper stands.

Transvaal Manufacturers

CUSTOMS TARIFF AND RAILWAY RATES.

Mr. L. Serocold Skeels presided at the annual meeting of the Transvaal Manufacturers' Association, this week, in the Chamber of Commerce Board Room, Johannesburg.

The speaker welcomed Mr. F. S. Malan, the Acting Prime Minister, who attended in his capacity as Minister of Mines and Industries, and Mr. Warington Smyth, the Secretary for Mines and Industries.

After regretting that the Government had not given effect to the recommendations of the tariff committee of the Advisory Board of Industry and Science, he added: "It is true that the Government has recently appointed a Board of Trade and Industries, amongst whose duties it will be to advise the Government in the recasting of the Customs tariff and the adjustment of anomalies which may from time to time occur. We regret, however, that this Board has no statutory powers, and I trust Mr. Malan will forgive me when I say that we manufacturers are beginning to look on Advisory Boards and Tariff Committees with some suspicion and impatience, and we feel that it is almost a case of 'Whilst Nero is fiddling, Rome is burning.'"

There was urgent need, he claimed, for the proper and legitimate protection of industries which General Smuts had stated they must have. He noted with regret that the new Board possessed no member with first-hand or practical knowledge of the troubles of manufacturers.

"The omission to appoint such a member," said the speaker, "is, to my mind, a great mistake, not only from the point of view of justice and fair play, but from the political point of view, and, under the circumstances, it is difficult for manufacturers as a class to credit the Government with the best intentions; and consequently it is difficult for manufacturers as a whole to give such support to the Board as is necessary for its success, and without which the Board must fail; and with it must fail the declared policy of the Government."

Railway Rates.

The extreme importance of railway rates was next urged by the Chairman, who declared that the reactions which followed an alteration of rates were so marked, and had involved hardships which made it clear that the Railway Administration stood in great need of practical advice.

"We raise this question year after year, and are put off with a sympathetic reply from the General Manager to the effect that, whenever possible, the Railway Administration will be only too pleased to consult interested parties. From the fact that our various associations get these replies periodically, though without result, and from the fact that there is a curious resemblance in the actual wording of the various replies over a period of years, one might almost be tempted to think that the Administration kept a stock form of letter for the purpose.

"In any case we cannot continue to be put off with this obsolete method of giving non-committal, though sympathetic, replies, and the time has arrived when manufacturers must ask the Government to give the firm support promised by General Smuts to our industries, and not to allow the present policy of constantly increasing railway rates to continue. It injures our industries and incidentally tends to discourage railway revenue rather than to increase it."

The Chairman voiced his surprise at the general lack of knowledge amongst employers regarding the Witwatersrand Juvenile Advisory Board and the bureaux attached to them, to which, he said, employers could go when requiring juveniles for their offices or works, and where the greatest pains were taken to select suitable boys and girls, incidentally with no cost to employer or employees.

After testifying to the tact with which the Factory Act had been administered by the officials in Pretoria, he remarked that the sooner legislation was enacted to compel people to mark their goods with a South African trade mark the better, for such action would, he thought, compel all manufacturers to place on the market goods of only the highest quality, such as would be a credit to South Africa. He drew the lessons of the need for an improvement in quality and better overseas publicity methods. The manufacturers, he said, agreed with the view that tariff revision would enable the country's industries to absorb a large number of the men and women now unemployed.

Mr. S. Hillman, seconding, said the manufacturers were able to hold their own providing they got fair play—railway rates at a proper limit; Customs arranged accordingly. South African manufacturers had nothing to be ashamed of, and took heed of past mistakes.

Mr. L. Serocold Skeels was unanimously elected President of the Association, and in acknowledgement said he would do everything in his capacity for the cause they all had at heart. Mr. S. B. Friede was elected Vice-President. The following were elected to the Executive Committee: Messrs. S. Hillman, A. C. Maytham, B. S. Cox, E. Davidson, W. J. Holmes, H. Evans, S. M. Herbert, J. S. Hancock, W. H. Batten and Louis Marks.

NEW COMPANY REGISTRATIONS.

No. 6820, South African Assets, Ltd., 52, Cullinan Buildings, Simmonds Street, Johannesburg; £5,000.

No. 6824, The Union and Rhodesia Investors Protection Society, Ltd., 2 and 3, Permanent Buildings, Harrison Street, Johannesburg; £1,000.

No. 6827, Yule & Co., Ltd., 14-15, African City Properties Trust Buildings, 76, Market Street, Johannesburg; £1,000.

No. 6829, Boshof Oils, Ltd., c/o Edward Thomas Duckles, 119-120, Stock Exchange Buildings, Johannesburg; £16,250.

No. 6830, Free State Reefs, Ltd., c/o W. T. Hallimond and E. C. Lowe, 43-44, Central House, Simmonds Street, Johannesburg; £150,000.

Alterations and Additions to Foreign Companies.

No. 4012, The Texas Co. (South Africa), Ltd., Johannesburg.
No. 6706, Kodak (South Africa), Ltd., Johannesburg.
No. 4130, Cape Explosives Works, Ltd., Johannesburg.

Prospectuses.

Pretoria Forfar Collieries, Ltd., Pretoria; Transvaal Pers, Beperkt, Pretoria; Barker's African Marbles, Ltd., Johannesburg.

Rhodesia Exploration.

The net profit of the Rhodesia Exploration Co., Ltd., for one year and nine months to March 31 last, £6,607, and £2,248 was brought in from last balance sheet, making £8,855. Written off preliminary expenses and underwriting commission £7,593, leaving £1,262 to be carried forward. Middelburg Coal: The company holds a half interest in coal rights on 18 farms in the Middelburg, Carolina, and Ermelo districts, and has increased its interest in the farm Maraisdrift of 4,570 acres in the Far Eastern Rand (Heidelberg district) and now holds a 5-6ths interest. Part of the purchase consideration of this further portion has been satisfied by the allotment of 100,000 shares of 3s. each. Interest in asbestos and chrome is represented by shares and debentures in Rhodesia Base Metals, Ltd. Up to date the investment has cost £27,000. Claims in Rhodesia are represented by 222 claims and a [illegible] per cent. interest in John Bull and Phœnix West Parallel blocks. With regard to this latter and those blocks of claims owned entirely by the company adjoining the Globe and Phœnix property it is intended to discuss matters with the Globe and Phœnix Co., and thereafter to determine the policy to be pursued. The demand for land in Rhodesia, which was very active up to the early part of last year, has been checked by the financial conditions generally prevailing, but during the year 147,591 acres were sold at satisfactory prices.

The Week in the Sharemarket.

IMPROVING—FIRM UNDERTONE—"C.M.S." STOCKS IN FAVOUR—DIAMOND SYNDICATES ACTIVE.

A slight but welcome improvement has made itself felt in the market this week, and the undertone is decidedly better. The gold premium remains at a satisfactory figure, though below the best point recently touched. Money is said to be cheaper in London, and the news from there is more hopeful. There has been a little more demand for Far East Rand stocks during the week, on the better dividend prospects, and the "C.M.S." group has been most favoured. Springs and West Springs are better on improving development results and the latter on the prospects of striking the reef in the No. 2 shaft. Consolidated Diamonds, on a report that a big parcel of their stones had been sold at a good price, through the selling syndicate of course, were in strong demand. Indeed, all diamond shares were firmer in view of the prospects of a revival in the diamond market. It is said that so great are the accumulated stocks of stones that the big producers will continue to restrict operations to the advantage, of course, of the small mines which may reap the benefit of the good prices obtainable. Apart from Far East Rand gold shares and diamonds, the market is not busy, but doubtless the improvement will gradually extend to all sections. The week's quotations are as follow:

	Fri 12th.	Sat. 13th.	Mon. 15th.	Tues. 16th.	Wed. 17th.	Thur. 18th.
Anglo Amer. Corp. .	—	22 9	22 6	23 3	23 6	24 4½
Apex Mines	6 3*	6 6*	6 9*	—	6 9*	6 9*
Bantjes Cons. . . .	4 10*	4 10*	4 10*	4 9*	4 9*	4 11
Brakpan Mines . .	—	52 6*	52 0*	52 0*	52 6	53 0†
Brick and Potteries	—	4 0*	—	—	4 6†	—
Brit. South Africa .	11 0*	—	—	—	—	—
Bushveld Tins . . .	0 6*	0 6*	0 6*	0 6*	0 6*	0 6*
City and Sub. . . .	—	2 3*	2 3	2 4*	2 3*	2 3
City Deeps	49 9*	48 6*	48 6	48 6	—	47 9a
Clydesdale Colls. . .	—	—	25 0*	26 0*	—	26 0*
Con. Diamonds . .	17 4½	17 3	17 6	17 9	17 9*	19 0
Con. Invests. . . .	23 9*	—	—	—	—	—
Con. Langlaagtes . .	13 6*	14 0*	15 0	15 0*	15 0*	15 0*
Con. Main Reefs .	10 6*	10 9	—	10 3*	10 3*	10 3*
Con. Mines Select..	—	—	14 0*	14 6*	—	15 6*
Coronation Colls. . .	—	40 0*	—	40 0*	—	—
Do. Freeholds . .	1 0†	0 9	0 9*	0 9*	0 10*	0 10*
Do. Syndicates . .	5 0*	5 6*	6 0	6 0	6 0*	6 0*
Crown Diamonds . .	3 3*	3 3*	3 3	3 9	3 9	3 9
Crown Mines . . .	—	41 0*	—	40 6*	41 0*	41 0*
Daggafontein M. . .	3 1*	3 1	3 0*	3 1*	3 1*	3 0*
Durban Rood Dps. .	—	—	—	—	4 3*	—
East Rand Coals .	2 1*	2 1*	2 1*	2 0*	2 1*	—
East Rand Deeps .	0 6*	0 6*	0 6*	—	0 6*	0 6*
E.R. Mining . . .	8 0*	—	8 0*	8 6*	8 3*	—
E.R. Props. . . .	5 4*	5 3*	5 6*	5 9*	5 6*	5 9*
Eastern Golds . . .	0 6*	—	0 7*	0 7*	0 7*	0 7*
Ferreira Deeps . .	—	8 0*	—	8 0*	—	—
F. Smith Dias. . .	4 0	3 11	4 0	4 4*	4 3	4 4*
Geduld Props . . .	50 0†	49 0	49 3	49 3*	49 0	49 0*
Glencoe Colls. . . .	13 0*	14 0	14 0*	14 0*	14 3†	14 6†
Glynn's Lyden. . . .	5 6*	—	—	5 9*	5 9*	—
Govt. Areas	81 6	81 3*	81 3*	82 0	82 0	82 6
Hume Pipes . . .	14 0*	14 0*	15 0*	16 0†	—	17 0*
Jupiters	1 9*	—	1 9†	—	—	—
Knight Cents. . . .	4 3	4 0*	4 4	4 4*	4 3*	4 3*
Knights Deeps . . .	—	—	3 6*	—	—	—
Lace Props. . . .	7 0*	7 0*	7 0*	7 0*	7 0*	7 0*
Leauwpoort Tins . .	9 9*	9 9	9 3*	9 6*	9 10*	10 0
Luipaardsvlei Ets. .	1 9*	—	—	1 9*	1 10*	1 10
Lydenburg Farms .	5 7*	5 6*	5 6*	5 7*	5 6*	5 6*
Langlaagte Ests. . .	12 0*	12 0*	12 0*	—	—	12 6*
Modder Wests. . .	—	2 6†	2 6†	2 6†	—	2 6†
Meyer & Charltons .	75 0*	80 0†	77 0*	—	—	—
Modder B's . . .	29 0*	29 3	29 3	28 6*	28 3*	29 0†
Modder Deep . . .	44 9	44 0*	44 0	44 3	44 3	44 3
Modder Easts	10 9	10 4½	9 10½	9 7½	9 9	9 10½
Natal Nav. Colls. .	34 0†	33 9	—	33 0*	33 0*	32 0*
New Eland Dias. .	22 6*	22 6*	—	22 0*	22 0*	23 0*
New Era Cons. . .	7 3*	7 3*	7 6	7 3*	7 3*	7 6
New Geduld Dps. .	1 4*	1 4*	1 4*	1 4*	1 4*	1 4*
New Kleinfonteins .	—	5 10*	5 10*	5 10*	5 10*	5 10*
New Modderftn. . .	71 0	71 3	70 0*	70 6*	70 3	70 9*
New Unifieds . . .	3 0*	3 0*	3 9	—	—	—
Nigels	—	4 6*	4 6*	4 3*	4 6*	4 3*
Nourse Mines . . .	8 6*	—	8 3*	8 9*	—	8 9*
New State Areas .	24 6*	24 0*	24 6*	24 6*	25 3	25 0
Premier Defs. . . .	91 0*	—	90 0*	90 0*	90 0*	—
Pretoria Cements .	47 6	48 6*	48 6a	47 6*	47 6*	48 0
Princess Estates . .	0 11*	0 11*	0 11*	0 11*	0 11*	—
Rand Collieries . .	0 10*	0 10*	0 10*	0 10*	0 10	0 10*
Rand Nucleus . . .	—	1 1*	—	1 1*	1 1*	1 0*
Rand Select. Corp.	48 9*	—	—	47 6*	—	52 6*
Randfn. Central . .	10 6*	11 3*	11 3	10 9*	10 9*	—
Randfontein Est. . .	17 4½	17 0	16 9*	16 9*	17 0	16 9*
Roberts Victors . .	8 0*	8 3*	8 0*	8 6*	9 0*	9 6*
Rooibergs	4 0*	4 0*	4 1*	4 3*	4 3*	4 3
Rouxville Dias. . . .	1 9*	1 9*	1 9*	1 10*	1 10*	1 9*
S. Van Ryn	2 3*	2 4*	2 6	2 8*	2 9*	2 11*
S.A. Townships . . .	10 9	10 9*	10 9*	—	11 0*	11 0*
S.A. Alkali	16 6*	16 3	16 3*	16 3*	16 3*	16 9
S.A. Breweries . . .	—	—	—	—	26 3*	26 3a
S.A. Lands		4 3*	4 2*	4 2*	4 2*	4 3
Springs Mines . . .	—	39 6	39 9	41 0	41 6	42 6
Sub Nigels . . .	11 3*	11 0*	11 0*	11 6	11 0*	11 0
Swaziland Tins . . .	—	—	10 0†	10 0†	10 0†	10 0†
Transvaal Lands . .	—	16 9*	16 9*	16 9*	16 9*	17 0
Trans. G.M. Ests. .	—	—	9 6	8 6*	9 0*	9 0*
Trans. Silvers . . .	22 6*	23 6	23 6*	23 6	23 0*	22 6*
Tudors	0 4*	0 4*	0 5*	0 5*	0 4*	0 4*
Theron Dias. . . .	12 6*	11 3*	11 3*	8 6*	—	—
Union Corps. . . .	15 0*	—	15 0*	15 0*	16 0†	15 0*
Van Ryn Deeps . .	72 0a	72 0*	71 0*	71 6	71 6*	72 0*
Village Deeps . . .	4 3*	—	—	9 0*	8 9*	—
West Springs . . .	12 4*	12 3	12 3*	12 7½	12 10½*	12 9
West Rand Cons. .	—	2 6†	—	2 6†	2 6†	2 6†
W. Rand Ests. . .	4 0*	4 0*	4 0*	—	4 0*	4 0*
Witbank Colls. . . .	—	43 3*	44 0	44 0	43 9*	43 0*
Witwatersrands . . .	10 6*	—	—	11 3*	11 3*	11 3*
Do. Deeps . . .	6 6*	7 0*	6 6*	4 0*	6 6*	7 0*
Wolhuters	4 0*	4 0*	4 0*	3 9	4 0	4 0
Zaaiplaats Tins . . .	3 3*	3 3	3 9	3 6*	3 6*	3 6*
Union 5 per cent. .	£98⅞	£98¾	£98 18/3	£99⅛	£99¾	—

* Buyers. † Sellers. a. Odd lots. b. Ex London.

The Union's Mining and Other Revenue.

Putting aside loan account, the Union Treasurer estimated the 1921-22 revenue at £29,150,000. During June he received £1,914,348, and for the quarter ended June 30 £6,315.794. The quarterly return shows a substantial drop on the corresponding quarter of 1920, when the amount was £7,565,319. Customs are expected to yield for the financial year £6,315,000. The revenue for the quarter was £1,230,546, against £2,539,861 in 1920. Excise, with an estimate for the year of £2,151,000, shows a quarterly return of £360,527, against £371,195 in 1920. Post, Telegraphs and Telephones show up fairly well compared with 1920, though short on the comparative estimate, but mining shows extraordinary fluctuations. The diamond mines are estimated to produce in the year £100,000. So far this year their return has been nil, against £304,500 in the corresponding 1920 quarter. The export duty on diamonds, with an estimate of £300,000, has yielded a mere £18,018 in the quarter, against £311,552 in the 1920 quarter. Gold mine leases, estimated at £600,000, have not produced a penny so far. The Government's share of bewaarplaats is estimated at £90,000 for the year, and £9,520 was collected in June. The sale of Crown lands is a variable quantity. Calculated at £180,000 for the year, it gave £22,460 for the quarter, as against £45,085 in the 1920 quarter. Licences are comparatively steady—£10,241 for the quarter, compared with the previous £9,252. Stamp duties and fees show a big drop from £220,168 in the 1920 quarter to £171,829. The year's estimate is £965,000. The rush on the normal, super and dividend tax is shown by a quarterly collection of £1,589,909, against £936,413 in 1920. The return, if kept up, will reach the yearly estimate of £5,952,000. Excess profits duty also shows swelling revenue. The revenue for the quarter was £716,161, against £352,545 in 1920, and £1,300,000 for the whole year.

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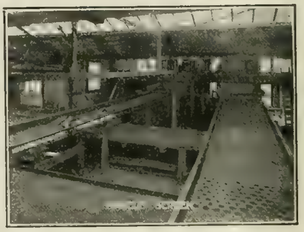

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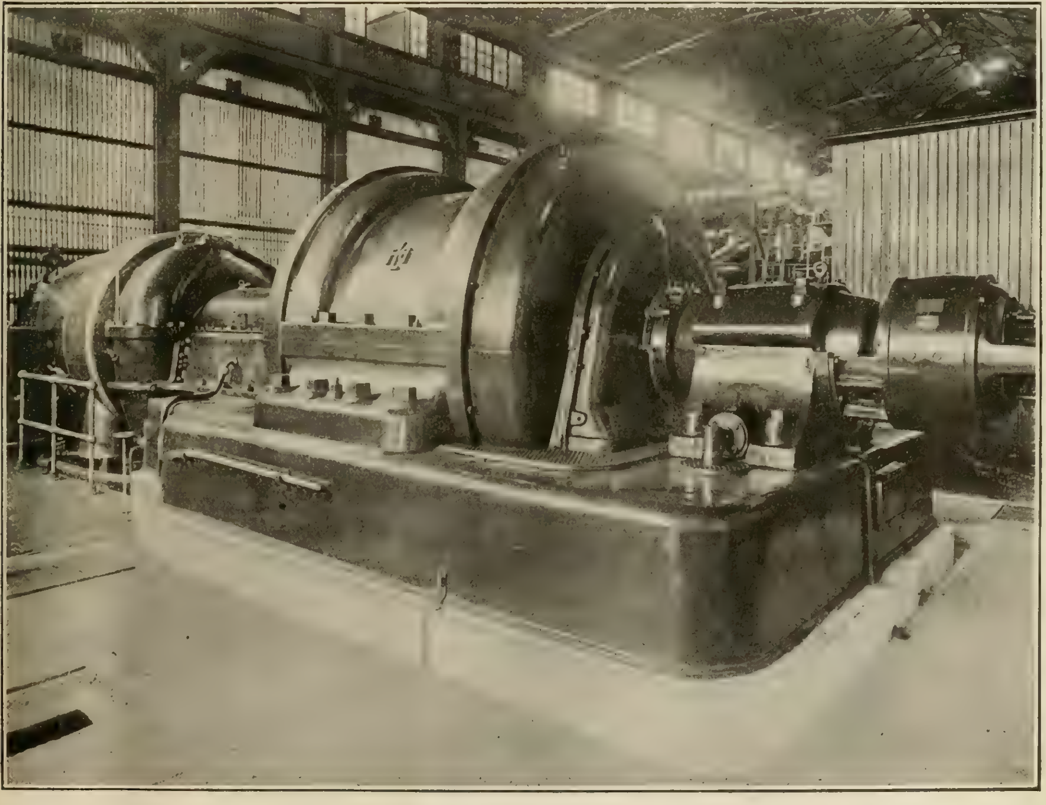
ENGINEERING SECTION.

Mechanical Advantages of Electric Locomotives Compared with Steam.

By Sir Vincent Litchfield Raven, K.B.E.

The mechanical disadvantages of the steam locomotive may be briefly summarised as follows: (1) The locomotive being a complete independent unit, its power cannot be greater than tne capacity of its boiler; (2) to increase the boiler capacity obviously implies increased dimensions and weight, both of which offer grave difficulties in regard to clearances and strengthening of bridge structures; (3) it is known that on many railways in Britain the limit of weight has been reached, and further development of power is only possible at enormous expense; (4) the boiler, cylinders, valve-gear, crankshafts and all reciprocating parts are costly to maintain; (5) turntables, fuelling plant and water supply appliances must be provided; (6) the cab is too small and open to the weather, involving discomfort to the locomotive crew; (7) the locomotive radiates heat and uses coal all the time steam is up—that is, during many hours when it is doing no work, and either standing by or coasting; (8) the wear and tear of the locomotive on the track is considerably increased by the impossibility of accurately balancing the reciprocating parts.

The case for the electric locomotive may be set out by the brief statement that it is not hampered by any of the above-mentioned objections. In addiion, one might point out that it possesses other important qualifications, such as: (1) Simplicity of mechanical construction and operation; (2) increased power of acceleration; (3) higher scheduled speed due to the possibility of heavy short-period overloads resulting in a more frequent service and increased use of existing tracks; (4) uniform turning effort, resulting in a better factor of adhesion at starting and on gradients; (5)



Johannesburg Municipal Power Station, which is now to be further enlarged to meet the growing demands for light and power.

absence of reciprocating movement and accurate balance of all rotating parts; (6) facilities for driving from either end of a locomotive; (7) accessibility of mechanical and electrical parts; (8) better accommodation for locomotive crew by reason of increased cab area and by closing in and heating the cab; (9) possibility of coupling two or more locomotives together under the control of a single driver.

Two special points may be referred to, namely, the fuel economy made possible by the use of electric locomotives, together with maintenance costs, and the various designs of electric locomotives depending upon the method adopted to transmit power from the motors to the driving axles.

Fuel Economy.—The production of energy in a power station rather than on the locomotive leads to a very substantial economy of fuel. On a steam locomotive fitted with all modern improvements it is not practicable to work at less than about 2½ lbs. of best quality coal per b.h.p.-hour, and very few engines are capable of doing this for any length of time. Taking into account additional fuel required for lighting up, stand-by losses, periods of uneconomical working, and other factors continually met with in practical working, the average consumption is more like 3½lbs. per b.h.p.-hour for passenger engines, and 5lbs. for goods engines.

On the other hand, with electric locomotives, whether passenger or goods, and with up-to-date power station and sub-station plant, it is possible to reduce the consumption of fuel to 1¾lbs. per hour, or even less, of low quality coal per b.h.p. produced on the locomotives. In other words, electrification enables the fuel consumption to be reduced to one-half or one-third, the fuel employed being of a quality unsuitable for steam locomotives.

Cost of Maintenance.—Experience with regard to the cost of repairs of electric locomotives working between Shildon and Newport shows that this cost is approximately one-third that of maintaining the steam locomoives which worked this traffic previous to 1915. The difference in America, however, is much greater, as Mr. Armstrong (chairman of the Electrification Committee of the General Electric Company) gives figures showing the cost of repairs per mile of three American railways varying from 6.3 cents to 14.6 cents, as compared with a cost of 60 cents per mile for a 2-8-8-2 Mallet steam engine, which is the class of engine that would have to be used to haul a similar train to that taken by the electric locomotive, the cost of repairs of which is 14.6 cents, or one-fourth that of the steam engine.

Class of Drive. There are two general classes: (1) In which the motors are built direct on the driving axles, or are connected to them by reduction gearing; (2) in which the power of the motors is transmitted to the driving axles through connecting and coupling rods. In each of these two classes there are numerous distinct types depending upon the details of the drive.

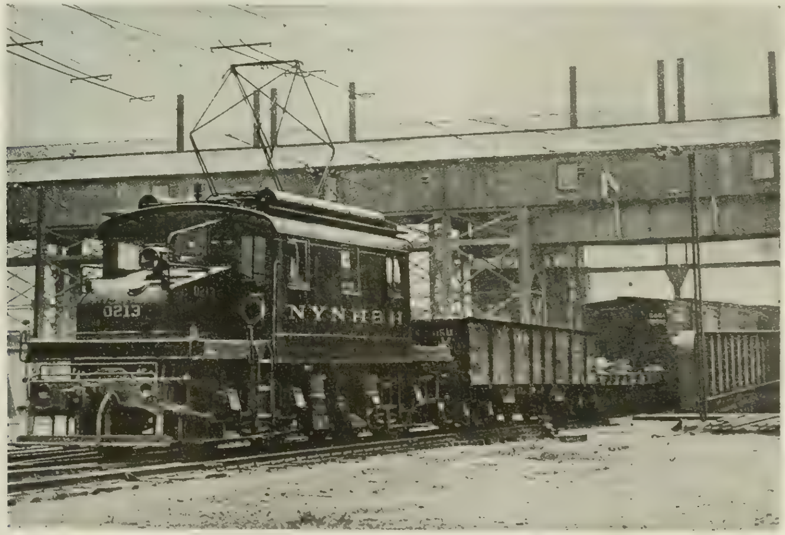
METHOD OF CLEANING WOOD-LINED PIPE COLUMNS.

It is a matter of common knowledge to all Rand engineers that pipe columns are being continually choked by deposits separating from the water passing through them. The following two methods of cleaning affected pipes are used locally. In the first method used on pipe columns discharging from centrifugal pumps the deposit is removed by means of a specially constructed steel wire brush. The column is treated in about 500 foot lengths, and after having removed a section of the piping at the desired length a ⅝ in. rope is let down the pipe. On reaching the place where the section is removed the steel wire brush is attached to the rope and pulled through the pipe by means of a hand winch. The process is somewhat similar to the cleaning of a rifle barrel by means of a pull-through. Water is allowed to pass down the pipe while the brush ascends, in order to wash away the loosened deposit.

The second method is used on pipe columns discharging from reciprocating pumps, and takes advantage of the oscillations in the water produced by the action of the pump. The appliance used for cleaning the pipe is as follows: It consists of two brass balls of unequal diameter, say 5 in. and 3 in., which are held apart by a strap passing through their centres. The apparatus is attached to a wire rope with the bigger ball uppermost, and then let down the pipe. When the furred portion is reached the balls cannot pass through but rest on it, and the oscillations in the water cause the balls to hammer against the sides of the pipe and thus break up the deposit. The increased velocity in the water due to the temporary closing up of the passage by the balls carries away the broken up deposit. The balls gradually travel down the pipe as the deposit is broken up.

Hyatt Roller Bearings for Elevators and Conveyors.

We have received a copy of the latest sectional catalogue dealing with the application of Hyatt roller bearings to elevators and conveyors. Messrs. Hyatt will be pleased to send copies to any interested readers.



An Example of Successful Railway Electrification in the U.S.A.

Armstrong-Whitworth.

The directors of Armstrong, Whitworth & Co. sum up existing conditions as follows:—At the present time engineering, in common with other industries, is suffering from depression of trade. Contracts have been suspended or cancelled, and it is impossible to tell what may be the ultimate effect of the recent crisis in the coal trade, which involved the company in partial suspension of operations for a period exceeding three months. The works are equipped with the most modern machinery and, in conjunction with the subsidiary firms, the company is in an exceptionally favourable position to undertake work of great magnitude, the capacity of the company's establishments being now double what it was before the War. There is still a large amount of work in hand which has been delayed by industrial difficulties, and, in addition, some important contracts have recently been secured by the civil engineering and other departments.

Motor Fuels.

Attention is being given to the manufacture of composite fuels for motors in various countries. Remarkable claims have been made for some of these fuels, and the evidence appears to favour the belief that mixtures of ethyl alcohol with other ingredients will be widely used, not only to conserve petrol, but to increase engine efficiency.

Typical formulæ for compounds of this nature are seen in the patent specifications of E. C. R. Marks (British, No. 153,925-1919), and W. J. Hoffman (U.S.A., 1,367,968). The former gives three compounds with freezing point below 60 deg. F. (1) 40 vol. EtOH, 28 vol. petrol, 17 vol. benzol, 7½ to 10 vol. ether, 8 vol. of toluene; (2) 20 vol. EtOH, 20 vol. petrol, 15 vol. kerosene, 35 vol. methyl ethyl ketone, 5 vol. ether; (3) 15 vol. benzol, 40 vol. EtOH, 30 vol. petrol, 15 vol. ether. The latter consists of a hydrocarbon distillate (*e.g.*, kerosene) mixed with a solution of picric acid and methyl alcohol impregnated with acetylene.

Self-Dumping Cages.

At No. 8 mine of the Ayrshire Coal Co., at Oakland City, Ind., the cage installed permits the use of solid body cars. This cage was described by D. J. Baker in a recent issue of *Coal Age*. The mine is only about 100 ft. deep, but the cages have to be lifted a distance of 150 ft. The car employed has a length of 10 ft. over all, a width of 5 ft., and a height of 3 ft. It has a capacity of 3 tons or more. At the bottom the loads gravitate to a landing, where they are held by steel horns, being released one by one by an automatic cager which feeds them to the cage. When there the car rests in a cradle which is mounted inside a hopper having a hinged discharge gate. This cradle is built in the form of a hoist platform, and thus the cage can be advantageously utilised for handling coal, men or material. The cradle is pivoted on heavy trunnion shafts placed upon either side. These shafts carry the dumping arms, which are fitted with rollers at their outer ends. As the cage approaches the dumping point these rollers, working in guides at the top of the headframe, rotate the cradle and the car upon it through an angle of 135 degs., thus discharging the contents of the car into the hopper within which the cradle swings. Both cradle and hopper are positively locked except when the cage nears the dumping point. As the cage approaches the point of discharge the guides operate to unlock the hopper gate as well as the cradle on which the car rests. The rollers on the overturning arms then enter the main dumping guides, whereby the cradle is revolved easily and continuously without interruption until the car reaches its inverted position. As the cradle is pivoted at a point only slightly to one side of its centre of gravity when loaded, the platform is so hung that the pressure on the dumping guides is almost negligible. The weight of the car and cage always rests on the hoisting rope. This gives a maximum counter-balancing effect, assisting the hoist in starting the load from the bottom of the shaft. This in turn materially reduces the peak of the hoisting-cycle curve and allows the installation of a hoist of smaller capacity than would otherwise be necessary. An average of two trips per minute with one cage can be attained easily. When both cages are put in operation the hoisting of four cars per minute may be confidently expected.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS STILL QUIET BUT EXPECTED TO IMPROVE SHORTLY—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—ANNUAL MEETING OF TRANSVAAL MANUFACTURERS' ASSOCIATION—UNION RAILWAYS DEFICIT—TRADE AND GENERAL CONDITIONS IN BRITAIN—BREVITIES—METAL MARKET.

General Position.

Business has been very inactive this week with, however, renewed cutting of prices on the Commercial Exchange. This severe competition has been going on for a long time, and there are no present signs of its early cessation. Iron and steel are fairly steady with the exception of the heavier lines, which show a falling tendency; corrugated iron has this week again slightly fallen off. Timber also is somewhat easier; in short, the general tendency is still towards lower levels. The present dullness notwithstanding, the feeling in mining circles is optimistic that—provided the dispute in the building trade regarding reduced wages is satisfactorily settled—we are on the eve of improving business conditions. Merchants are all of opinion, notwithstanding the present impasse, that an amicable solution will be found, and that probably, as in the case of the miners, a way out of the trouble will be found in the shape of a compromise. At any rate, this appears to be our last hurdle, and if successfully negotiated, as it is generally thought will be the case, our way seems clear to renewed activity shortly. There is undoubtedly a tremendous amount of building work to be done, only awaiting lower cost of labour, as building materials, by no means so important an item, have declined considerably of late, and at the moment show signs of still further declining. It is interesting to note that the Dutch Government has recently passed a law prohibiting workers from working more than 45 hours a week. Previous to this the men had been working 10 hours a day, and on that basis a large constructural firm had secured a very important contract. It appears, however, that later on the workers decided upon an eight-hours' day, and in order to enable labour to be better distributed the Dutch Government insisted upon bringing down the working hours per week to 45.

Iron and Steel.

Business this week has been of a very restricted nature with but few inquiries. Quotations received from the Continent during the week show that bar iron and steel plates have dropped a further 30 per cent. to 40 per cent., with which prices it is, of course, impossible for Britain to compete—at any rate for the present.

Latest quotations:—Dunswart, 29s.; Union Steel Corp., Ltd., ordinary sized rounds, flats and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 45s.; ⅜ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron, 37s. 6d.; steel, 39s. 6d.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 45s. to 57s. 6d.; ¼ in. square iron, 55s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ½ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 52s. 6d. to 59s.; channels and joists, 47s. to 48s.; shafting, ⅝ in., 10¼d.; ¾ in., 10d.; 1 in., 9½d.; 1¼ in. to 2 in., 8½d.; larger sizes, 8d.; steel plates, 1-16 in., 33s. 6d.; ⅛ in., 33s.; 3-16 in., 33s.; ¼ in., 31s. and upwards; all 100 lbs., 31s.; spring steel flats, 8½d. to 9d. per lb.; bolts and nuts, ⅜ in., 1s. to 1s. 2d. per lb.; ½ in., 65s. per 100 lbs.; ⅝ in., 62s. 6d.; ¾ in., 60s.; nuts, ⅝ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅝ in. and ¾ in., 8½d.; ½ in., 6½d.; ⅝ in., 6d.; ¾ in., 6d. per lb.; dog spikes, 35s. per 100 lbs.; rivets, ¾ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 50s.; ⅝ in., 50s. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 7d.; ½ in., 1s. 5d.; ⅝ in. and upwards, 1s. 4d.; brass sheets, 2s. 2d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 2d. to 2s. 4d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7d.; hollow, 10d. to 1s.; wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 57s. 6d. to 60s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; fencing wire, 30s. to 50s.; barbed wire, 33s. to 34s. 6d.; per 98 lb. coils; 24s. to 25s. per 68 lb. coils, large, 12 gauge, 28s. 6d. per 96 lb. coil; 14 gauge, 22s. 6d. per 66 lb. coil; plain wire, No. 8 galvanised, 35s., and black 32s. 6d. per 100 lb. coil.; fencing standards, 12, 14, and 16 lb., at 27s. 6d., 30s. and 32s. 6d. respectively per dozen; screening, 3s. to 9s. 6d. per square yard; cyanide for outside mines, 1s. 6d. to 1s. 7d. per lb.; zinc shavings, about 1s. per lb.; copper tubes, solid drawn, ¼ in., 3s. 9d. per lb.; ⅜ in., 2s. 11d. per lb.; 7-16 in., ½ in. and 9-16 in., 2s. 9d. per lb.; ¾ to 1⅛ in., 2s. 6d. per lb.; 1½ in. to 2 in., 2s. 3d. per lb.; 2½ in. to 3 in., 2s. 6d. per lb.; 3½ in. to 4½ in., 2s. 8d. per lb.; copper rods, ⅜ in., 2s. 5d. per lb.; ½ in., 2s. 4d. per lb.; ⅝ in. to 2½ in., 2s. 2d. per lb.

Iron and steel prices at Home, although heavily reduced in order to meet foreign competition, are still now considerably higher than those quoted by the Continent, and only this week the latter notify a further reduction of from 30 per cent. to 40 per cent. in bar iron, steel plates, etc. In Britain, since the cessation of the coal strike, only a few mills have resumed operations, and progress towards normal activity is bound to be slow. Fuel prices will have to be substantially lowered to permit of profitable manufacture. Large consignments of pig iron continue to arrive in Britain from Belgium at £7 5s., as against British quotations of £8 10s. to £9. Midland manufacturers are quoting heavy steel rails at £14, fishplates and sleepers at £19, and galvanised sheet at £24.

New York advices are to the effect that the new prices announced for steel products have already been cut by the independent companies. Steel manufactories continue to show stagnation. The new process for the manufacture of steel rails in Canada will eventually cut down the costs of production and enable Canadian mills to enter competitive markets. American steel manufacturers' production is about 25 per cent. of capacity.

In Germany it is stated that the ironworks are overwhelmed with orders and that home and foreign orders for machinery are increasing.

The South Wales Siemens' Association has decided further to reduce the price of steel bars another pound per ton to 170s. in order to cope with foreign competition. Belgian bars are being offered at 145s

Engineering Shops.

Business is fair, but awaiting the settlement of the building wages dispute. The railways are carrying out a drastic retrenchment programme, and although this may cause hardship in individual cases, the action, under the circumstances, seeing our monthly increasing deficits, appears absolutely necessary A prominent engineer thought this step on the part of the Railways was a necessary one, but he thought the Government, before taking it, might have exhausted every other possible avenue of development. He thought that if the Government would collaborate with the banks and guarantee credits the present depression would vanish. If the Government had adopted a well defined policy of supporting local industries then the skilled artisans presently being discharged by the Railways could have been absorbed in such enterprises. What the Government is going to do in the matter of its poverty-stricken and discharged employees remains to be seen.

Timber and Building Materials.

Timber is still a shade easier, with a downward tendency; 3 x 9 deals, 1s. 1d. to 1s. 2d.; scantlings, 1s.; floorings, 7d. to 7¼d.; ceilings, 5½d. to 5¾d.; beaver board, 4¾d. to 5d.; pitchpine, 9s. to 9s. 6d.; oregon, 7s. to 8s.; corrugated iron, 9½d. to 10d. Fresh consignments of pitchpine are arriving, and this it is expected will be sold at about 8s., showing a decline of from 1s. to 1s. 6d. on current ruling price. Furniture timber: Burmah teak, 18s. 6d. per cube landed Johannesburg, for first quality, 14s. 9d. for seconds at the coast; American oak, 1s. 2½d. at coast; Japanese oak, 1s. 3½d. at coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cubic foot per truck load lots, in planks, at mills, Rhodesia; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12, Johannesburg; American fine shelving, 1s. per foot on spot. Consignments of furniture timber from India and Japan are delayed. Bricks are ruling at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; blue lime, 3s. 9d.; blue plaster, 4s. 9d. to 5s.; cement, 11s. 6d. a bag; damp, course and roofing, 37s. 6d., 47s. and 55s. 3d. for 1, 2 and 3. In the building trade there is no change to report, things being extremely dull. There has been more inquiry for bricks and building materials this month than for some time past, and nothing seems to stand in the way of a general improvement but the question of the reduction of wages. It is generally anticipated that there will be no trouble and that an amicable arrangement will be arrived at possibly in the nature of a compromise. The drop from 4s. 3d. to 3s. 8d. per hour is somewhat drastic, and may have only been formulated to allow of a bargain. That this seems to be the correct reading is shown that at the conference between employers and employees on Tuesday last the masters reduced their proposed cut of 7d. to 6d., to take effect from September 16. This offer, however, was not accepted by the workers, and the position at the moment is one of absolute deadlock.

The second-hand iron and timber yards are still marking time, with abundant stocks, but very few orders coming in. Prices for iron are 6d. to 7d., for timber 10d. to 11d., with a tendency to go lower. Inquiries are at the moment very poor.

Reduction in Building Materials at Capetown.

Cape Town merchants have decided to reduce prices by from 20 per cent. to 25 per cent., to take effect immediately.

Electrical Goods.

Business in town and along the Reef is again slack, but in the event of a satisfactory settlement of the present wages dispute in the building trade things are expected to improve considerably shortly. Prices of electrical wares remain much about the same, with, however, a falling tendency. Stocks are arriving steadily from Britain and the Continent and to some extent also from America. American wares are a shade cheaper than British, while the latter are some 30 per cent. to 40 per cent. dearer than the Continental stuff.

Transvaal Manufacturers' Association.

Mr. L. Serocold Skeels, O.B.E., presiding at the annual meeting on Monday last, welcomed Mr. Malan, the Acting Prime Minister, in their midst. The Chairman stated that, as manufacturers, generally speaking, they found themselves to-day in a much worse position than they did a year ago, owing to the world-wide trade depression, the slump in the wool and maize markets, and to the fact that the Customs tariff had not been properly framed. He regretted that the Government had been unable to give effect to the recommendations of the Tariff Committee of the Advisory Board of Industry and Science. He asked the Government to fulfil the pledges given last December that "firm support must be given to those industries, which have arisen and which are now exposed to heavy attack from oversea industries," and that "proper and legitimate protection must be given to our own industries and prevent a relapse to the industrial helplessness that we were in before the war."

Union Railways' Deficit.

The Railway earnings for the week ended August 6th were: Passengers, £119,928; parcels, £11,782; goods, £167,476; coal, £73,384; livestock, £11,399; miscellaneous, £15,875; total, £399,844; being £35,358 below the estimate The total from April 1st to August 6th was £7,570,932, which is £401,561 below the estimate for that period.

The British Board of Trade Returns for July.

The British Board of Trade returns for July show a huge shrinkage in business compared with July of last year. The imports totalled £80,757,000, a decrease of £82,370,000, while the exports totalled £43,172,000, showing a reduction of £94,280,000.

Wage Reductions in Britain.

The employers in the printing and allied industries have submitted revised wages proposals, viz., a reduction of 7s. 6d. per week for men instead of 10s., and 3s. for women, the reductions to be spread over August and September. A ballot is now proceeding.

The National Union of Railwaymen has ratified the national agreement with the railway companies, fixing the new scale of wages for signalmen, with wages ranging from 75s. to 48s. per week. Glasgow locomotive builders at Glasgow have reduced the weekly hours by sixteen owing to the cancellation of orders.

The negotiating committee of the general manager of railways, at a conference with representatives of the National Union of Railwaymen, the Federation of Engineering and Shipbuilding Unions, and the National Federation of Building Operatives, proposed a reduction of wages of 6s. weekly from August 15th. The settlement depends on the decision of the Amalgamated Engineers' Union, which was not represented at the conference.

Decontrol of British Railways.

The Government control of the railways, assumed at the outbreak of the war, ceased on Monday last (15th August), and the lines have been handed back to the management as commercial undertakings. The Government guarantee of shareholders' dividends has also automatically ceased. The feeling is abroad that the reversion of authority to the owners will eventually benefit both traders and travelling public.

British Unemployment Decreasing.

The unemployment figures since the conclusion of the coal strike show continued improvement and a reduction of 386,000 for July.

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kindly mention the

SOUTH AFRICAN MINING AND

ENGINEERING JOURNAL.

Safeguarding of Industries Bill.

The Safeguarding of Industries Bill passed the third reading in the House of Commons by 176 to 54.

Slump in Whale Oil.

Stocks of this oversea are unusually large. A year ago this oil was selling at £90; to-day the companies are prepared to sell at £35.

Trade Losses.

As illustrating the trade slump the annual report of the firm of Rylands & Sons, Ltd., Manchester, shows a loss during the first six months of £1,263,000.

Renewed Trade with Russia.

The resumption of commercial relations between Britain and Russia appears to be benefiting trade considerably. Russian imports show an increase of 40 per cent. during the first six months of the year.

Coal Reductions in Britain.

Cardiff distributors have reduced the price of household coal by 8s. per ton. In Newcastle prices are falling rapidly. Steam coal has dropped there 10s. per ton within the past week. Good bunker coal is now obtainable at 30s. That the import of British coal to Germany is increasing is evidenced by the arrival at Hamburg last week of ten fully-laden British colliers.

The shipbuilding firm of Yarrow & Co. are closing down temporarily on September 30, owing to repeated strikes and reduced output, which precludes them from promising dates of delivery. Their belief is that business will only come when it accords with economic laws.

Authorities show the selling price of merchant vessels as costing £17 per ton to build in Britain and only about £7 per ton in Germany and Belgium. Holland also is contracting at prices very much below British.

S.A. Reserve Bank.

According to the statement for the week ended August 13 the ratio of cash reserves to liabilities to public is 103 per cent.

Diamond Trade Revival.

A remarkable revival in the diamond trade has taken place in Belgium, where some thousands of people engaged in the industry previously unemployed have resumed work. The revival is attributed to the exhaustion of the influx of diamonds from Russia permitting the trade to take its normal course.

To Harness the Tides.

This scheme has been approved by the Ministry of Public Works, France, and it has now been decided to establish an experimental power station at Abervash Bay, in Brittany.

Wave Force.

An Italian engineer claims to have solved the principle of the commercial application of the force of the waves to work motors.

Power from Wood Refuse.

In England recently there was on exhibit a 65 h.p. suction gas plant in operation driving an engine, which was making gas from saw mill refuse, bark, shavings, or other wood waste. This plant takes only from 2½ lbs. to 3½ lbs. of wood per brake horse power per hour, according to the quality of the wood refuse.

A Sydney cable reports a rich gold discovery at Glen Innes. It is stated that one specimen contains 40 ozs. of gold. Naturally, a rush has set in.

Metal Market.

Latest quotations: Standard copper, £69 17s. 6d. cash, £70 2s. 6d. forward; electrolytic copper, £74 10s. cash, £76 forward; Straits tin, £155 10s. cash, £156 10s. forward; English lead; £23 10s. cash, £23 2s. 6d. forward; bar silver, 37½d. per oz.; fine gold, 112s. 1d. per oz.; quicksilver, £10 10s. The metal market has shown an improvement during the week owing to reduced coal prices.

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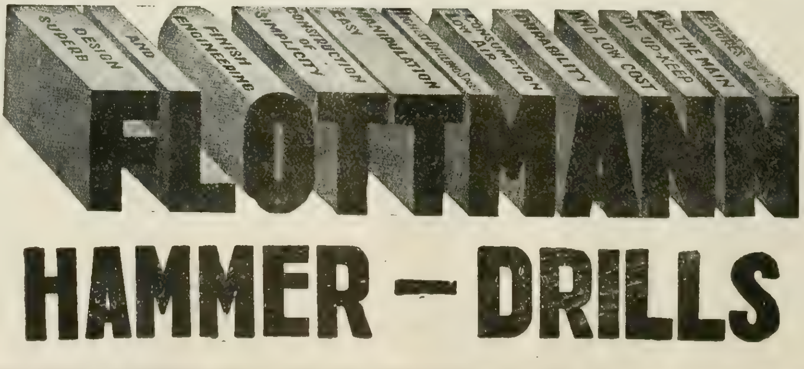

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A Summary of Group Returns.

QUARTER ENDED 30th JUNE.

Central Mining—Rand Mines Group.

Company.	Tons Crushed.	Yield in fine gold ozs.	Estimated Value.	Estimated Profit.	Estimated working costs per ton.
			£	£	s. d.
Cons. Main Reef	145,200	51,124	265,383	29,317	32 6
Ferreira Deep ..	97,200	32,379	168,617	38,926	26 8
Geldenhuis Deep	144,070	38,762	201,274	*3,548	28 5
Modder B. ..	173,500	96,170	500,952	280,367	25 5
New Modder ..	280,000	132,354	689,512	353,174	24 0
Robinson ..	119,500	23,775	123,220	6,912	19 6
Village Deep ..	141,600	45,216	235,401	22,261	30 0
Totals and Avgs.	1,101,070	419,780	2,184,359	734,505	26 7·7

Valuation of gold at: April, £5 3s. 3d.; May, £5 3s. 0d.; June, £5 6s. 3d·

*Loss.

General Mining and Finance Group.

Company.	Tons Crushed.	Total Cost.	Cost per Ton.	Total Revenue.	Profit.
			s.		
Aurora West ..	32,290	43,302	26·82	45,155	2,143
Meyer & Charl. ..	40,700	54,382	26·72	124,689	70,736
New Goch ..	50,600	58,469	23·11	60,045	2,384
Roodepoort Un.	68,400	75,230	22·00	70,623	3,739*
Van Ryn Est. ..	96,220	122,983	25·56	146,725	27,249
West Rand Cons.	97,300	133,393	27·42	145,160	12,749
	385,510	487,759	25,255	592,397	126,000

Value of gold at: April, 103/9 per fine oz.; May, 103/9 per fine oz.; June, 107/6 per fine oz.

*Loss.

Consolidated Mines Selection Group.

	Stamps Working.	Tons Milled.	Working Costs per ton.
Brakpan Mines	110	163,200	27/9·087
Springs Mines	80	127,400	29/7·585
Totals and Averages ..	95	290,600	28/8·336

	Value of gold declared.	Yield per ton.	Working Profit based on standard value of gold.	Working Profit per ton.
Brakpan Mines ..	£279,113	34/2·46	£52,613	6/5·373
Springs Mines ..	£240,726	37/9·488	£51,970	8/1·903
Tls. and Avgs. ..	£519,839	35/11·974	£104,583	7/3·638

	Estimated Premium.	Total Estimated Profit.
Brakpan Mines	£63,701	£116,315
Springs Mines	£55,094	£107,065
Totals and Averages	£118,795	£223,380

New Kleinfontein Company, Limited.

Report of Directors for Quarter ended 30th June, 1921.

Tons crushed	143,700
Total yield of fine gold ozs.	40,254
Estimated gold revenue for quarter including adjustments	£212,444 12 1
Net working profit	£16,049 1 11
Total working costs per ton milled	27/4·009

New Consolidated Gold Fields Group.

Company.	Tons Milled.	Total Yield in fine gold ozs.	Revenue from gold.	Workin Costs.	Estimated Nett Profit.
			£	£	£
Robinson Deep	176,600	53,573	280,631	230,693	43,530
Sub-Nigel ..	28,400	17,655	90,408	71,040	14,289
Simmer & Jack ..	182,000	43,221	222,625	191,590	29,068
Tls and Avgs. ..	387,000	114,449	593,664	493,323	86,887

Value of gold at: April, 103/3 per fine oz.; May, 102/3 per fine oz.; June, 106/- per fine oz.

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BY the adoption of the planetary system of gearing an efficiency of 80 per cent. is obtained with this hoist, and the use of steel and malleable iron in every working and load sustaining part has made this hoist capable of withstanding loads very much above the rated capacity, and one in which repairs for broken parts are practically eliminated.

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JOHANNESBURG

AND AT KIMBERLEY AND DURBAN.

The Week's Meetings.

VEREENIGING ESTATES.

The twenty-second ordinary general meeting of shareholders of the Vereeniging Estates, Ltd., was held at Lewis and Marks Building.

Mr. Julius Weil presided and there were also present or represented by proxy: Messrs. Isaac Lewis, Barnet Lewis, Louis Marks, Henry D. Lewis, Gilbert Roy Lewis, Theodore Marks, George Falcke, F. A. E. Wells, R. W. Townsend, L. H. Lavenstein, Henry Greyham, E. S. Marcus, G. F. Ayling, Alfred Hird, G. F. Rowsell, Sim Greyham, T. R. Bradberry, Elizabeth Marcus, W. H. Bond, the African and European Investment Co., Ltd., L. First, the estate of the late Samuel Marks and William Mallinson, secretary.

The chairman having declared the meeting duly constituted, called upon the secretary to read the notice convening the meeting.

The minutes of the twenty first ordinary general meeting of shareholders, held on May 15, 1920, were taken as read, confirmed and signed.

The secretary read the auditors' certificate as shown on the accounts submitted.

The chairman, in moving that the directors' report and accounts for the year ended December 31, 1920, be adopted said:—

I regret that your chairman, Mr. Isaac Lewis, is unable to preside to-day owing to his absence in Europe.

The results of last year's operations are reflected in your directors' reports and audited statement of accounts for the year ending December 31, 1920, together with the report of the general manager of your Cornelia Collieries, which have been in your possession for some time and I presume as usual will be taken as read.

Dealing with the accounts you will see that the gross profit for the year under review amounted to £55,639 13s. 7d. as compared with £46,744 13s. 11d. for the year 1919, and £39,414 6s. 8d. for the year 1918. This increased profit of £8,894 19s. 8d., compared with the year 1919, and an increased profit of £16,225 16s. 11d., as compared with the year 1918 is, I think you will agree, proof of your company's steadily growing prosperity. This profit is arrived at after making a provision of £9,556 2s. 11d. in respect of a dispute with the Victoria Falls and Transvaal Power Company, Limited, as to the interpretation to be placed on the agreement with that company for the supply of Duff coal.

A dividend at the rate of 5 per cent. less tax on all shares fully paid up and on all shares partly paid up on the amount paid up to all shareholders registered on December 31, 1920, was declared by your directors on April 4 last. The payment of this dividend absorbed £44,153 18s. 8d. leaving £14,673 12s. 10d. to be carried forward to the next balance sheet. I shall ask you later to confirm the directors' action in the matter.

Farming Operations.

The profits on farming and forestry show a falling off of £1,775 6s. 3d as compared with 1919, but an increase of £7,642 1s. 7d. as compared with 1918. The reduced profit for last year as compared with the previous year was due to the slump in the wool market which your directors are confident is only temporary. Mr. Massey Premier of New Zealand, speaking in London last month, gave some striking figures showing that the number of sheep in eight of the principal wool producing countries was 355 millions in 1910, and only 290 millions in 1921, a decrease of nearly 20 per cent., and further gave as his opinion that in all probability the world's supply of wool would soon be unequal to the demand. Being convinced that sheep farming will be one of the best paying of your farming operations, no effort has been spared in improving and enlarging the flocks. A valuable addition was made to the stud flock in September last by the purchase of 145 high class stud ewes and four high class stud rams from Urangeline, Australia, one of these rams being a prizewinner at the Sydney Show

During the past five years the weight of wool per sheep has increased by just over 2lb. The quality has also improved to a remarkable degree. Our slaughter sheep have fetched good prices in Johannesburg.

Cattle breeding continues to be one of our most profitable farming ventures. Last year the increases again exceeded all previous years. The herds are now a very fine lot, and reflect what can be done by the use of pedigree bulls and careful selection in mating.

Last year's mealie crop was fair, and good prices were obtained for it.

The Leeuwkuil irrigation scheme which our chairman informed you at the last annual meeting was in hand, is now completed. Water is lifted from the Vaal River by electrically-driven pumps capable of delivering two million gallons every 24 hours into the Leeuwkuil dam —capacity 40,000,000 gallons—from which it gravitates on to the land. The area immediately available for irrigation from this dam at Leeuwkuil is 800 acres of rich soil. This land is particularly suited to closer settlement. It is only two miles from the town of Vereeniging, with its mines and other industries, and 40 miles by rail from Johannesburg. It is the intention of your directors that as soon as the lucerne, which has been sown, is established, to divide the land into 10 to 15 acre plots, and to offer same with a supply of water on long leases to desirable tenants. In this way a steady income will be assured. This scheme will be the forerunner of other irrigation schemes along the banks of the river. Your company, I would remind you, has over 10 miles of river frontage, of which 25 miles are in the Transvaal.

Maccauvlei Forest and Orchards.

As you will have seen from the report of the directors, the year under review was again a favourable one for the forests. A considerable amount of felling and thinning was carried out during the year, and satisfactory prices were obtained for the timber, a proportion of which is sold locally.

Several cottages for white employes and a compound for natives have been built and a number of wells have been sunk, these additions being rendered necessary on account of the extra hands employed in connection with the felling and transporting of the trees.

Your apple orchards are in a flourishing condition. The 1920 apple crop realised £7,050, and the current year's crop was sold for £7,635. This revenue was obtained from only 4,000 trees in full bearing out of the total number of 10,000 trees in the orchards. As the remaining 6,000 trees come into bearing it will be seen that the revenue from this branch of your company's operations will be considerably increased.

Collieries.

It is somewhat difficult for me in dealing with the collieries to add anything to what Mr. Isaac Hedges, the general manager of the collieries, has already said in his very comprehensive report to the directors, which has been in your hands some time. I will, however, emphasise one or two points.

You will note from the tabulated statement included in the report that the annual output of saleable coal from the Cornelia Colliery has increased since the year 1911 from 262,076 tons to 645,412 tons for the year 1920. For the six months ended June of this year, 326,046 tons of coal were sold, or an average of 54,341 tons per month. The output for the month of June was 56,153 tons. This is a record of progress of which your directors are justly proud, and I think you will agree that our thanks are due to the general manager and the staff of the colliery for the excellent results achieved.

The underground workings were formerly subject to serious outbursts of water from the dolomite, and ten years ago 11 tons of water were pumped to the surface per ton of coal sold.

Improved methods of dealing with this dolomite water have been put into operation, and the volume pumped to the surface has been reduced to three tons of water per ton of coal sold.

Vereening Brick and Tile Co., Ltd.

The works of this subsidiary company continue to make good profits. The demand for our sanitary ware and roofing tiles has necessitated the installation of additional machinery, which will be electrically driven. The excellence of manufacture, for which this company has long held a high reputation, is fully maintained, several medals and diplomas being awarded its exhibits at this year's Witwatersrand Agricultural Show.

Vereeniging Township.

Twelve erven were sold at good prices, and a fair number of buildings were erected in the township during the year.

Tenders are being called for a handsome town hall to be erected on the Market Square. The bricks and tiles used in this building will be supplied by your subsidiary company.

The Rand Water Board is busy with the construction of the settling tanks, works, and dwelling-houses at Vereeniging in connection with the Vaal River water scheme.

Messrs. Stewart, Sanders and Co. are now erecting their works, covering three acres, for the manufacture of bolts, nuts, horse shoes, etc. This is another industry established at Vereeniging since our last meeting.

The Union Steel Corporation (of South Africa), Ltd., in which, as you are aware, your company holds an interest, had a most successful year.

The directors have again much pleasure in placing on record the board's appreciation of the services rendered to the company by its officials and staff.

I now beg to move the adoption of the directors' report and accounts.

Mr. T. Marks seconded the chairman's motion which, on being put to the meeting, was carried unanimously.

Mr. Geo. F. A. E. Wells moved and Mr. Geo. Falcke seconded that confirmation be made of the action of the directors in declaring on April 4 last a dividend at the rate of 5 per cent., less tax, on all shares fully paid up and on all shares partly paid up on the amount paid up to December 31, 1920, to all shareholders registered at December 31, 1920.

No other nominations having been received, the chairman declared the retiring directors, Messrs Gilbert Roy Lewis and E. S. Marcus duly re-elected.

Messrs. Douglas Low and Co., the company's auditors, were declared re-elected, no other nominations having been received. The fee for the past audit was left in the hands of the board to fix. The meeting terminated with a vote of thanks to the chairman.

The South African

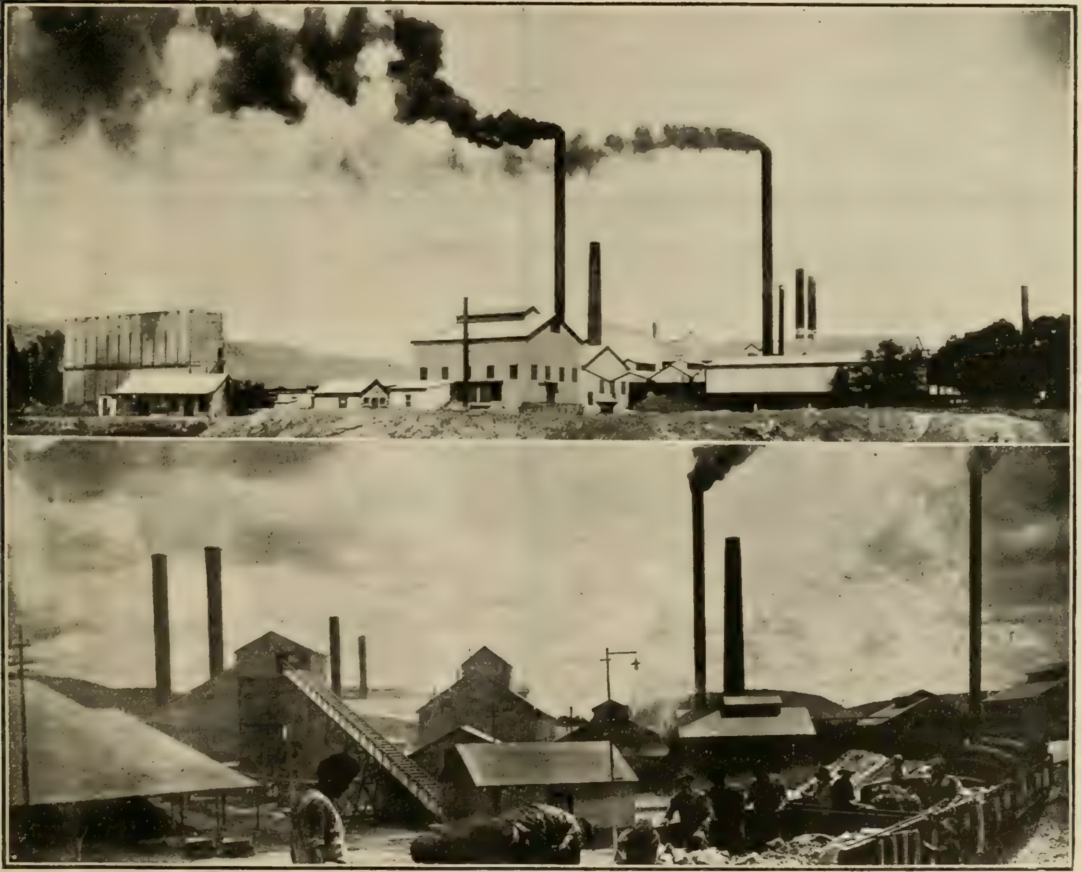
Mining & Engineering Journal

THE ONLY WEEKLY MINING PAPER IN THE CONTINENT OF AFRICA.

Established 1891.

Vol. XXXII., Part I JOHANNESBURG, TRANSVAAL, SATURDAY, AUGUST 27, 1921. No. 1561.

A FLOURISHING TRANSVAAL INDUSTRY.



TWO VIEWS OF PRETORIA PORTLAND CEMENT WORKS.—EXTRACTS FROM THE ANNUAL REPORT OF THIS THRIVING INDUSTRIAL COMPANY APPEAR IN THIS ISSUE.

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Rand Working Costs and Efficiency.

By Percival Henry Ellis.

It is often argued that any mine is but a temporary affair, yielding such profits as to make efficiency work of no consequence; but any business which is profitable and worth doing at all is worth doing on a basis which gives the greatest return on the investment. In this short paper I intend to deal chiefly with one factor in Rand mining, viz., the Contract System. It appears to me that working costs could be materially lowered by the total elimination of the present contract system, and the substitution for it of a bonus-premium system, under which the miner would receive a guaranteed day's pay, plus a bonus the amount of which would vary with the efficiency of his work; in other words, it would depend upon the amount of rock broken.

Under the present piecework system, if the management considers that a contractor is earning too much, his price per fathom is " cut," with the result that he has to work harder and break more ground in order to obtain the same wages as before. In fact, he often finds it almost impossible, with the reduced price, to earn the same wages. But under the bonus-premium system, with equitable standards of attainment, the more ground a man breaks the greater will be his own reward in wages, and the less will be the labour cost to the company.

I propose to consider the case of stopers and developers, and shall endeavour to show the truth of the above statement. And please let it be noted that the figures and calculations given are used merely to illustrate the principles laid down. Standards and figures will vary, of course, with different individuals and with the different kinds of ground they have to work in.

The first question that presents itself is whether it is possible to determine a fair standard fathomage for each individual stoper. I think the question can be answered in the affirmative. Take the case of a man working with three machines. We want to discover what is a fair monthly fathomage to set him as a standard. If we consider his work during, say, the previous 12 months, a fair standard for that man could be determined by adding one-half the difference between his best month and his monthly average to the monthly average, i.e., if his average for 12 months is 90 fathoms a month, and in his best month he broke 110 fathoms, then the standard would be

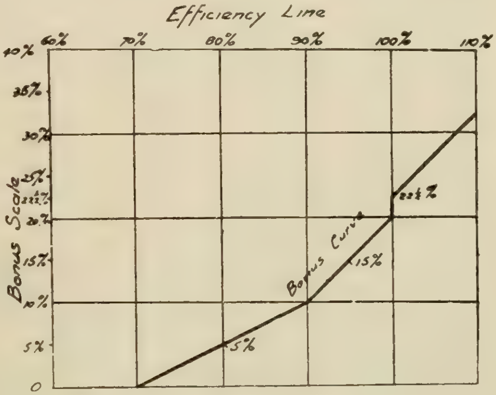
$$90 + \frac{110\text{-}90}{2} = 100 \text{ fathoms.}$$

Therefore, for this man, 100 fathoms a month would represent 100 per cent. efficiency.

Having fixed the standard, we come now to the method of payment—the bonus system. Efficiency is the ratio between what is done and what can be done—the relation between the actual and the standard. In other words,

$$\text{Efficiency} = \frac{\text{Actual fathomage.}}{\text{Standard fathomage.}}$$

The stoper is paid a guaranteed day's pay plus a bonus which varies with his efficiency. The chart given below (adapted from one given in Knoeppele's " Installing Efficiency Methods ") shows the bonus curve which I consider would be fair both to the stoper and to the company.



A Fair Bonus Curve.

The bonus line starts at 70 per cent. efficiency, i.e., the stoper is expected to attain slightly more than two-thirds of a fair standard of efficiency before he begins to earn any additional money as bonus. Any ground broken above this 70 per cent. mark would call for a proportionate amount of bonus.

It will be noticed that the inclination of the bonus curve varies somewhat in its different parts. The object of this is to induce men to get on to the more steeply inclined part of the curve, which gives them greater proportionate earnings than the lower portion, with the promise of an extra 2½ per cent. when they arrive at the 100 per cent. mark. A bonus of 20 per cent. plus 2½ per cent. premium would seem to be worth the extra effort to the man who has nearly reached the 100 per cent. mark. The bonus scale shown on the chart is given below in tabulated form:—

Efficiency. Per cent.	Bonus. Per cent.	Efficiency. Per cent.	Bonus. Per cent.	Efficiency. Per cent.	Bonus. Per cent.
70	0	79	4.5	97	17.0
71	0.5	80	5.0	98	18.0
72	1.0	90	10.0	99	19.0
73	1.5	91	11.0	100	22.5
74	2.0	92	12.0	101	23.5
75	2.5	93	13.0	102	24.5
76	3.0	94	14.0	110	32.5
77	3.5	95	15.0	120	42.5
78	4.0	96	16.0	—	—

Bonus would not be paid on one day's work, but on the average efficiency over a bonus period; in this case, one month.

ROYAL SCHOOL OF MINES FRECHEVILLE RESEARCH FELLOWSHIPS.

The Imperial College of Science and Technology, South Kensington, London, S.W. 7, with which the Royal School of Mines is incorporated, is offering two Research Fellowships of £300 a year each, tenable for one year and possibly renewable for a second year, to aid in carrying out any investigation or research connected with Mining, Mining Geology, Metallurgy or the Technology of Oil, which in the opinion of the Selection Committee is of sufficient use or promise.

Applicants who may be associates of the Royal School of Mines or others, and preferably men with some practical experience, if resident in South Africa, should apply in writing to the Secretary of the Chemical, Metallurgical and Mining Society of South Africa, Johannesburg (from whom further particulars may be obtained), before 1st September, 1921, giving the nature of the proposed investigation, qualifications for the work and references.

It is anticipated that the Committee will make the awards by the end of November, so that the Fellowships and work may begin on 1st January, 1922. Holders will be expected to devote their whole time to the work which may be conducted at the Imperial College or in special circumstances elsewhere at the discretion of the Committee.

An example showing how the bonus will affect a man's pay may make the matter clearer:—Standard, 100 fathoms a month; wage rate, say, 25/- a shift. Fathoms actually broken are 95, which in this case represents an efficiency of 95 per cent., which in turn gives a bonus of 15 per cent.

Then, Bonus = 25 shifts × 25/- × 15 per cent. bonus factor
= £4 13s. 9d.

Therefore—

	£	s.	d.
Wages	£31	5	0
Bonus	4	13	9
Total earnings for month	£35	18	9

The table given below outlines the effect of the bonus-premium suggested on the labour cost per fathom. Standard, 100 fathoms a month; wage rate, 25/- a shift = £31 5s. a month.

Monthly fathomage.	Efficiency. Per cent.	Wages. £	s.	d.	Bonus. £	s.	d.	Cost per fathom in shillings.
70	70	31	5	0	—			8.93
75	75	31	5	0		15	8	8.54
80	80	31	5	0	1	11	3	8.20
85	85	31	5	0	2	6	10	7.90
90	90	31	5	0	3	2	6	7.64
95	95	31	5	0	4	13	9	7.56
100	100	31	5	0	7	0	7	7.66
110	110	31	5	0	10	3	1	7.53
120	120	31	5	0	13	5	7	7.42
130	130	31	5	0	16	8	1	7.33

Increase in earnings from 70 per cent. efficiency to 130 per cent. is 52.5 per cent.

Decrease in cost from 8.93 shillings a fathom to 7.33 shillings, after paying this increase in earnings, is 17.9 per cent.

It must be emphasized that the standard should not be altered if a man by extra effort materially increases his earnings. The standard should be fair and just both to the man and to the company, but when once it has been fixed no limit should be placed on the amount a man may earn as bonus. If a man is earning bonus, it is merely another way of saying that efficiency, and therefore production, is higher than if he were not earning bonus.

We have now to deal with the question of "allowances." The responsibility of the management in this matter seems to be clear. Having set a definite standard it is obvious that it ought to help the employee to attain that standard by providing him with adequate means for doing so. Should it fail to do this, and in consequence the man cannot do his work on that day, it is the management that should be penalised, not the man. To put the matter more plainly, if the miner arrives at his working place and finds that, through the fault of the management or of its officials (which is the same thing), and through no fault of his own, he cannot do any work that shift, he will still be entitled to his day's pay plus any bonus he might have earned had he been able to work. His earnings could then be ascertained as follows: Calculate the fathoms broken at the end of the month, and determine the daily average over 24 shifts only, instead of the usual 25. Suppose this average to be 4 fathoms a shift. Then an additional 4 fathoms is credited to the man and bonus paid accordingly. On the other hand, if it is through the miner's own fault that he loses a shift, then in that case he gets neither day's pay nor bonus.

In applying the bonus-premium system to the developers, the standard, of course, will be based on footage.

It often happens that lashing and tramming are the causes of serious delay to stopers and developers. This delay could be minimised and the removal of "dirt" expedited by applying the bonus system to the trammers. To do this it would be necessary to ascertain the amount of lashing and tramming that the native can do per shift. This could be ascertained by careful time-study and observation of the performance of the work. A fairly accurate estimate of the tonnage per shift that a native could shovel into a truck could be reached by some such formula as the following:—

Let x = time in minutes for loading shovel and straightening up.

y = time for throwing dirt into truck.

z = percentage of time per shift spent in resting.

$$\text{Then } \left[(x + y \frac{\text{Pounds in ton}}{\text{weight of shovelful in pounds}}\right] (1 + z)$$

would equal the time in minutes required by the native to shovel the ton. An accurate analysis of the time-elements in this class of work would make it possible so to arrange the work that lashing and tramming would always keep pace with drilling. This being done, fix a standard for the man in charge of the lashing and tramming gang on the same lines as that for stopers and developers, and with the same bonus scale for varying degrees of efficiency.

Eventually the bonus system could be extended to other classes of underground employees, with a consequent increase in efficiency and decrease in labour cost.

In conclusion, I would like to say something about the drill-steel that is sent underground. It does not very much help the miner who is endeavouring to become 100 per cent. efficient, if you send down drills whose efficiency is only 75 per cent. or 80 per cent. And it may safely be affirmed that something like 20 per cent. of the machine drills sent underground each month are improperly tempered, and therefore, to a certain extent inefficient. It would be interesting to calculate the percentage of drilling efficiency that is lost through this cause. At all events, the question is important enough to call for more standardised conditions in that department of the mine.

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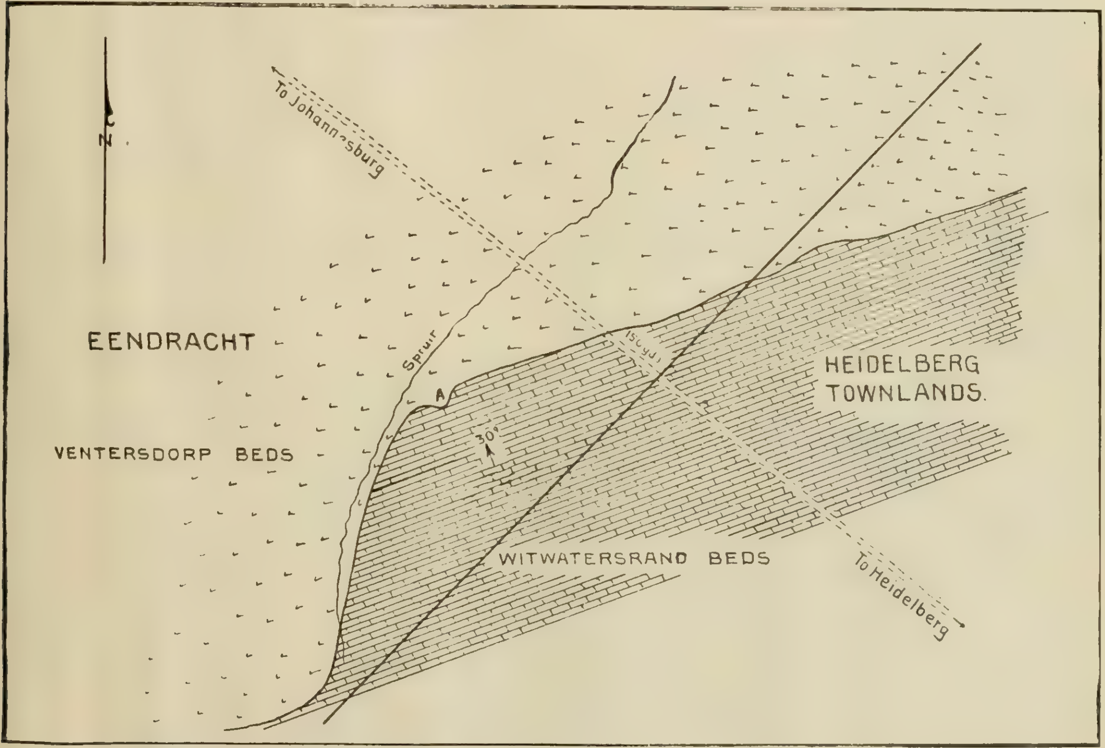
Geology of Heidelberg—II.

MR. BLELOCH'S REPLY TO DR. ROGERS—UNCONFORMABILITY OF THE VENTERSDORP SYSTEM.

Again to use Dr. Rogers' words, these " errors of correlation " may arise from his conclusion or " assumption "—I do not like to use that word even against Dr. Rogers—I would suggest " conclusion " as a more appropriate and more courteous word; assumption implies mere guessing, whereas conclusion implies decision based on evidence. I will, therefore, assume that Dr. Rogers has evidence of sorts and will say his conclusions—that the Ventersdorp system is conformable to the Witwatersrand system at Heidelberg, and that the topmost beds exposed in the Heidelberg district are those known on the Rand as the Elsburg series—are based on " incorrect data " and I will proceed to place before you evidence to show that these conclusions are erroneous.

In the limited time at my disposal I have only been able to look up a few authorities on this question of the unconformability of the Ventersdorp system to the Witwatersrand system. I have, however, gone to the trouble to look up these few authorities for the reason that I consider this to be by far the most important and decisive issue in the whole of the controversy. It is the fundamental question which governs the reading of the Witwatersrand system in the Heidelberg district and other outside districts. If it be true, as Dr. Rogers concludes, that the Ventersdorp beds at Heidelberg are conformable to the Witwatersrand beds and that the beds immediately below the Ventersdorp beds there are beds of the Elsburg series, that would be a factor which would have to be seriously considered in weighing up Dr. Rogers' conclusions in regard to the several horizons of the Witwatersrand system, in that area. I will remark, however, that even then the evidence would by no means be conclusive, because the possibility of an unconformity somewhere between the Elsburg series and the Lower Witwatersrand beds would then have to be considered—a possibility which has been recognised from time to time in the various discussions of the question both before this Society and elsewhere. For myself, I must say that I know of no evidence of such unconformity.

Drs. Hatch and Corstorphine, whose work Dr. Rogers states he finds generally correct and authoritative, make the following statement in regard to the relation of the Ventersdorp beds to the Witwatersrand system in their *Geology of South Africa*:—" Overlying the Witwatersrand beds and separated from them by a great unconformity is a series of acid and basic lavas, tuffs, breccias and conglomerates, which may be conveniently grouped together as the Ventersdorp system. At Ventorsdorp . . . their conformable relation to the Witwatersrand beds and the underlying Witwatersrand beds is clearly shown." Page 149—" Boulders and pebble beds consisting of boulders and large rounded pebbles of quartzites, which are unmistakeably derived from the Witwatersrand beds, are found." " The fact that the boulder beds are to a large extent made up of the debris of the Witwatersrand series points to a considerable denudation of the latter after their elevation above sea level and before the deposition of the Ventersdorp beds. The existence of a great unconformity between the two series is clearly shown by their stratigraphical relation. . . . The boulder beds can be seen with a dip of 5 degrees to the west lying on lower Witwatersrand quartzites having a dip of 50 degrees dip to the south."



As indicated at the last meeting, Mr. Luttman Johnston came to a similar conclusion, and no doubt members will recall similar conclusions arrived at by many other authorities. I would refer Dr. Rogers and other members of the Society especially to Drs. Hatch and Corstorphine's study of the question and to the sections shown in their book quoted from above. Dr. Hatch's map, 1903 edition, which Dr. Rogers has referred to and accepted as the standard geological map of the Witwatersrand system, shows pronounced unconformity of the

Ventersdorp beds in almost every area where these beds occur. It is possible that Dr. Rogers may never have examined the Klerksdorp-Buffelsdoorn area, for instance, where the encroachment of the Ventersdorp beds gradually covers bed after bed both of the upper and lower of the Witwatersrand system. On page 156 of the book already quoted above, Drs. Hatch and Corstorphine show the Ventersdorp beds lying unconformably to both the upper and lower Witwatersrand beds in their sectional diagram—Venterskroom-Potchefstroom. Dr. Rogers told us, too, at the last meeting that he has not examined the area between Balfour and Greylingstad and beyond, where similar unmistakeable examples of unconformity are to be seen and are shown on Dr. Hatch's map. Yet Dr. Rogers has been 3½ years in the Heidelberg district, and he makes the following very strong statements in his paper under discussion:—" Mr. Bleloch *assumes* that there is an unconformity at the base of the Ventersdorp system throughout the Witwatersrand and Heidelberg areas, and that the Ventersdorp formation rests near Heidelberg on rocks several thousand feet lower in the succession than it does on the northern flank of the Klipriversberg. Neither he nor anyone else has brought forward any evidence to support this assumption." I think I have shown that I am not alone in this. Dr Rogers would surely be wise to drop that word assumption and use the word conclusion.

An Example of Unconformity.

In order to give Dr. Rogers and the members of the Society the least possible trouble in examining an occurrence which completely disproves Dr. Rogers' statement just quoted, I will refer to one area in the Heidelberg district which is easy of access and conveniently situated for examination. The area is that close to the boundary line between the townlands of Heidelberg and the farm Eendracht. On the main road from Johannesburg to Heidelberg there is the townlands gate. About 150 yards on the Eendracht side of the gate, and just to the west of the road, there are outcrops of the uppermost of the Witwatersrand beds, which happen to be exposed at that place. Covering successive portions of these Witwatersrand beds, the Ventersdorp beds are to be seen lying on top of their upturned edges. The accompanying sketch plan will illustrate the occurrences. The strike of the Witwatersrand beds is very uniformly west by south, the angle of dip is 30 degrees from the horizontal, and the direction of dip north by east. I have placed some stones on an antheap at the spot marked " A " on the sketch plan, where a conglomerate of the Ventersdorp system is to be seen striking in a different direction to and lying on the beds of the Witwatersrand system. In a small cutting close to the road the dip of the Ventersdorp beds as exposed there appears to be from 10 to 15 degrees. The area in question presents quite as conclusive an example of unconformity as some of the examples shown by Drs. Hatch and Corstorphine in their book already cited. Moreover, the Witwatersrand beds thus exposed at the place in question strike directly towards and under the Ventersdorp beds, which a little further west by south cover them entirely and transgress over them almost to the townships fence as shown on the plan. I have already alluded to the area further south where the Ventersdorp system is shown on Dr. Hatch's map and also on Mr. Sawyer's plan accompanying his paper read before the Institute of Mining Engineers in 1898 encroaching over the Witwatersrand beds on the farms to the south of Goedverwachting, and completely covering the whole system in that area.

Sir Archibald Geikie on Unconformability.

In view of the importance of this question of the unconformability of the Ventersdorp beds to the Witwatersrand system, I trust you will allow me to call your attention in a footnote to what Sir Archibald Geikie says on the subject of unconformability, which, I think, is conclusive.

Text Book of Geology, Geikie, Page 592—" An unconformability leaves no room to doubt that it marks a decided break in the continuity of deposit. Hence no kind of geological structure is of higher importance in the interpretation of the history of the stratified formation of a country." " Two groups of rocks might on casual examination be pronounced to be conformable, yet a short distance on either side proofs of violent unconformability are conspicuous. An unconformability forms one of the great breaks in the geological record."

I think it will be well for Dr. Rogers to examine the area referred to, and also to re-examine all the ground in the neighbourhood of Heidelberg. It is possible that after he has made such re-examination and given consideration to the conclusions of his learned and contemporary confreres which I have quoted he may eventually find that he has been led into error, and he may change very radically his rather dogmatic pronouncements. He may find that the beds he has taken there to be the Elsburg beds are not Elsburg beds at all, but are in fact the upper beds of that horizon of the Witwatersrand system which lies above the so-called Kimberley series (our South Rietfontein beds), in the Far East Rand. I say this because the beds immediately underlying the Ventersdorp beds on Eendracht can be traced along their outcrops almost all the way into Grootfontein, that is, into a position which makes it certain that they must have been intersected by all the shafts on Springs Mines and Brakpan Mine, and indeed by all the boreholes and shafts on the Far East Rand, which exposed the Van Ryn Reef at depths of 3,500 feet and over. No one, so far as I know not even Dr. Mellor, has ever placed the Elsburg beds there, and I would call Dr. Rogers' attention to the announcement made recently that the borehole now being put down on Grootfontein by the Consolidated Goldfields of South Africa has passed at a depth of only 2,199 feet the base of shales which engineers of the orthodox school identify as those underlying the so-called Kimberley Reefs of the Far East Rand (our South Reitfontein series). The dolomite formation extends down 300 feet from the surface, so that if the Elsburg series are represented in that section they must have suffered still greater thinning out even than that which Dr. Rogers puts forward as having occurred to the lower Witwatersrand beds in the Heidelberg district.

Dr. Molengraaff's Opinion.

In this matter I will only make a few further references, one is to Dr. Molengraff's written opinion that he quite agrees with me about the Far East Rand. " I also think," he says, " that portion of the basin too shallow to give enough space for such a great thickness of the strata of the Witwatersrand system as would include the Main Reef series." " I also only expect lower Witwatersrand beds there." It follows that if the Main Reef series is not there, neither is the Elsburg series, and that is the conclusion of Dr. Molengraaff, probably as great an authority as any we have ever had in South Africa.

Dr. Carrick's Opinion.

Another reference is to the opinion of the late Dr. Carrick, who spent many years of his life studying the Witwatersrand system, and whose geological map accompanying his report on the Lace Proprietary Mines shows the whole of the Far East Rand denuded of the Elsburg series. It will be interesting to see how Dr. Rogers' mapping will show these Eendracht-Townlands beds along their course into the Far East Rand. The question I would ask him is, Will he mark them as Elsburg beds in that area? His predecessor, Dr. Mellor, has not done so, and Dr. Mellor has referred to the Far East Rand " as an extensive and comparatively shallow synclinal basin " (Transaction Geo. Soc. S.A., Vol. XVIII., page 57, and also on page 49 " as a broad and shallow syncline," and on page 67 he states that " the Elsburg reefs have been more or less denuded from the greater part of the Eastern Basin.")

Dr. Rogers may still find it unnecessary to restrict the beds of the Witwatersrand system in the Heidelberg district to a thickness of only about five-eighths of the system's known minimum thickness as exposed on the Rand, and he may yet withdraw the picture which he presents on page 34 of his paper, which shows the Witwatersrand system drawn in at Heidelberg like the figure of a tight-laced lady. I submit that the conclusions of the thinning of the beds of the Witwatersrand system which Dr. Rogers has come to is based on wrong premises, the chief among which is that the Witwatersrand beds immediately below the Ventersdorp beds at Heidelberg belong to the Elsburg series.

The Year with the Pretoria Portland Cement.

POINTS FROM THE ANNUAL REPORT—ACQUISITION OF NEW INTERESTS.

The Pretoria Portland Cement Co., Ltd., is generally regarded as one of the soundest industrial concerns in the Union, and its latest annual report fully confirms that view. The profit for the year, after making the usual deductions, amounted to £198,051. A balance of £19,258 was brought forward, making a total of £217,310 available for distribution. Of this £165,789 was distributed in dividends and dividend tax, leaving a sum of £51,520 to be carried forward. During the year the capital of the company was increased from £360,000 to £630,000 by the creation and issue to shareholders of 270,000 bonus shares of £1 each, representing the capitalisation of the items, Share Premium Account, £180,000, and Reserve Fund, £90,000, appearing in the last balance sheet

New Interests.

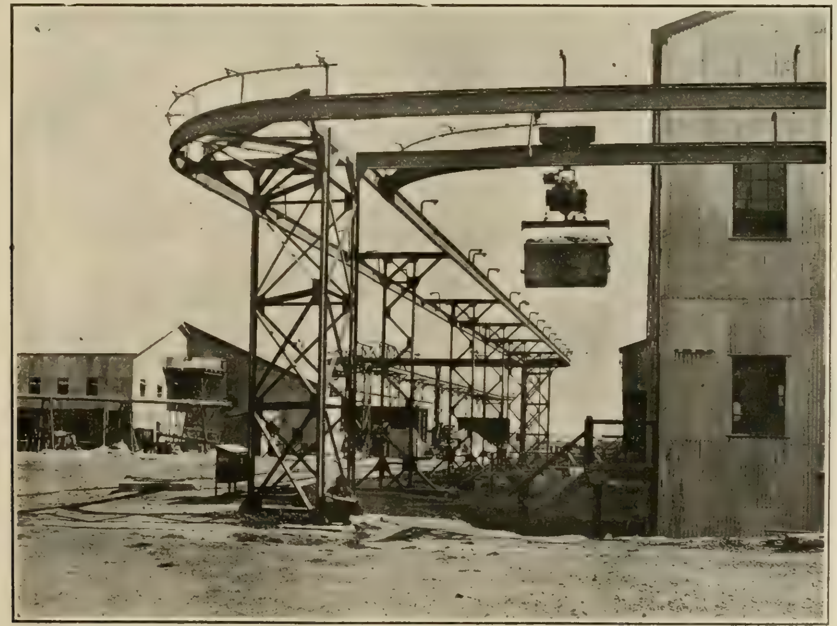
During the year the extensive and valuable lime deposits on the property on which the Slurry factory is situate were acquired; also 100,000 shares of £1 each in the Cape Portland Cement Co., Ltd. Ten shillings per share has been paid up on these shares. A further acquisition has been 12,500 shares of £1 each in the Hume Pipe Co. (S.A.) Ltd. This company, it is explained, consumes large quantities of cement, and it is considered that the connection which has now been secured will prove of mutual benefit. The major portion of the new machinery for No. 2 factory at Slurry has been delivered on the property, and the erection thereof is proceeding with all speed. Certain of the existing plant at Slurry has been sold to the Cape Portland Cement Co., Ltd. Two excellent views of the Pretoria works of the Company form our frontispiece this week.

The Lonely in July.

The following are particulars of gold, etc., from the Lonely Mine for the month of July:—Mill ran 704 hours; crushed, 5,400 tons; fine gold recovered, 1617.296 ounces; value, £6,800 19s. 9d.; slimes treated, 5,400 tons; fine gold recovered, 3562.458 ounces; value, £14,982 14s. 5d.; total fine gold, 5179.752 ounces; total value at 84s., £21,783 14s. 2d.; profit, £9,026 5s. 6d. The above profit includes the sum of £113 0s. 1d., being adjustment on May bullion.

Improving Diamond Trade.

Stories of acute depression in the diamond trade, which are coming from South Africa, are regarded with reserve by merchants (says the latest cable from London). A member of the firm of Backes and Strauss, diamond dealers, of Holborn Viaduct, stated yesterday that within the last few weeks diamonds have gone up in price 20 per cent. "We are not out of the wood yet," he said. "We cannot expect such a boom as we had in 1919. But things are steadily improving. Settlement of the coal dispute, with its consequent effect on all industry, has made a great difference. There is also a demand for diamonds in America, and that country has 26 buyers over here at present. Two months ago there were many cheap diamonds over here, but there has always been a demand for the poorer quality stones. Now that trade is brisk again, the better diamonds are wanted, and there is a demand for them in the East—in India and in China especially."



Aerial Haulage at the Randfontein Central.
The improved prospects of this Mine are now attracting much interest.

The Uses and Disadvantages of Second-Hand Plant

By R. C. Atkinson.

Paragraph 153, Section V., in the Low Grade Mines Commission Report, read as follows:—" It is at present very difficult and expensive to secure machinery for new mines. The closing down of some low grade mines may, therefore, be of advantage to these new mines in enabling them to secure suitable equipment at reasonable prices and without having to wait a long time for delivery."

To estimate the cost of any work anything like correctly, the estimator must know the cost of the material to be used, and also the cost of the labour to be employed. During the last few years, in fact since the Great War broke out, prices have never been stationary for any length of time, and correct estimation has been extremely difficult, in fact it has been almost impossible. South Africa has its own peculiar difficulties through not being a manufacturing country to any great extent, with the result that we have in the past been entirely in the hands of home and foreign manufacturers and their agents as regards the cost of manufactured goods. It has been a matter of impossibility to get firm quotations, tenders having always been subject to confirmation by principals oversea, and then prices were usually subject to any rise in freight rates, rates of exchange, increased cost of labour and the like. By way of showing the wide range of prices that have obtained during the last six years. I may state that a quotation for mild steel tanks received when prices were at their zenith was at the rate of £72 per ton, the same class of tank was procured two years or so before the war for £18 per ton. Many such instances could be given.

There has been no precedent for such fluctuation of prices and no amount of data collecting and careful records were of any value in the making of estimates. To those who understand the conditions which have prevailed during the last few years, it must appear surprising that so much has been attempted and accomplished under abnormal and trying conditions, and the marvel is not that estimates have been exceeded, but that in many instances they have not been practically doubled, more especially when the work estimated on has taken say a couple of years to complete. No remarks on estimating and the new conditions which have come upon us would be complete without reference to that nightmare of the estimator's existence—" second-hand material."

Now with reference to the paragraph cited from the Low Grade Mines Commission Report, I venture to say that the acquisition of second-hand plant is not quite so attractive a proposition as the wording of that paragraph might lead one to suppose. This can easily be proved by anyone who has had experience in the purchase, dismantling, transport and re-erection of such plants.

Let us consider briefly what is involved when we decide to instal an entire second-hand plant. The plant having been in operation for a considerable number of years will probably possess features which have long been superseded in more recently installed and up-to-date plants owing to improvements in practice—and these features require to be eliminated, not always an easy matter—in order that the latest practice may be adopted. It is easily conceivable that such alterations may entail an entire re-arrangement as regards the relative positions of various plant units. This in turn will affect the network of connecting links such as classifiers, launders, piping, pumps and pump lifts, etc. In other words the plant cannot be taken down and re-erected, piece by piece, all fitting in as before, as some may fondly imagine, but must in order to get the highest efficiency coupled with the lowest possible working costs be used only in such a manner that in conjunction with more up-to-date units, appliances and methods, the best results may be obtained; otherwise your costs will be high and your results poor.

It will at once be realised that the original drawings, even if these are obtainable, are of little use as regards the general arrangement of the plant in its new position, and if as not infrequently happens alterations have been made from time to time during the life of the plant, or should departures have been made from the regular drawings when the plant was first erected, such alterations not having been shown on the drawings, these are of little help even as regards the old units to be incorporated in the re-conditioned and modernised plant. Thus the drawing office work involved may easily exceed that required for a new plant. In the case of the latter, as most engineering staffs have their own standard designs, it is only a matter of referring to existing drawings and data of the most recent designs in order to decide what alterations or improvements are necessary to bring such a plant up to date. With our second-hand plant this becomes a more difficult operation in proportion to the number of years which may have elapsed since the plant was first designed. Thus the preliminary work before actual re-erecting operations commence is considerable and somewhat involved, and little saving, if any, is effected as compared with a new plant. The dismantling of the second-hand plant will reveal defects which could not be discerned by such inspection as is permissible before purchase, and these, together with such losses and breakages, which are inseparable from such an undertaking, must be taken into account. With the exception of what may be incurred during the process of dismantling, which is not in the programme of a new plant, these risks are usually taken by the supplier or covered by insurance. Our biggest unknown item of expenditure, however, will undoubtedly be on account of repairs and renewals, found to be necessary due to defects which could not be seen or located before dismantling.

This, perhaps, does not apply to the same extent to, say, a stamp mill, as to tanks, pumps, boilers, compressors, condensers, etc., or any machinery or mechanism which cannot be viewed internally before purchase. In the case of the mill, a careful examination before purchase will reveal, more or less, what is necessary in the way of expenditure to re-condition the plant, and a very fair approximation can be made of this expenditure, not forgetting, of course, that new foundations must be provided, and these cost as much for second-hand as for a new plant. When one comes to consider the other items mentioned, we may find that tanks which looked all right above ground require new bottoms, pumps require new liners and spindles, or the body of the pump itself is badly corroded inside; boilers require to be re-tubed. With regard to compressors or engines of any kind, cylinders probably require re-boring, new pistons and rings, piston rods, etc., are required. On opening out condensers, we find end plates cracked, and most of the tubes require renewing, and so on ad infinitum. By this time our estimate, if we have made one, is looking very sick indeed. And this brings me to the point I wish to make—when contemplating the purchase and re-erection of a second-hand plant, make your estimate in the usual careful way, and having arrived at a figure including the usual allowance for contingencies, add to that figure at least 20 per cent. for the unknown and your expenditure will probably balance with your estimate.

Even then, after our plant has been re-conditioned, re-erected and put to its duty, what have we got? A ten to fifteen year old re-conditioned plant, and it is safe to assume that maintenance costs will be higher than in the case of a new plant. The foregoing is sufficient, I think, to show how carefully such propositions must be approached before decision is made, and that the acquisition of second-hand plants is not so alluring as it would seem to be.

By this one does not mean to imply that such plants cannot be sold piecemeal to the mutual advantage of seller and purchaser, as much of it can be worked in for purposes where the remaining life in each particular unit can be usefully employed. It is the combination as a whole of such an old plant which is out of date, but this does not necessarily impair the usefulness of many of the units in other directions.—Extract from inaugural address before the S.A. Institution of Engineers.

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Industrial Progress.

UNION STATISTICS.

A Blue-book containing the statistics of Factories and Productive Industries (excluding mines and quarrying) in the Union from 1915 to 1919 has been issued.

The total number of factories in the Union in 1918-19 was 5,968, the value of land and buildings owned and rented was £16,276,196, and the value of machinery, plant and tools £20,979,778. These factories employed 143,088 hands, of whom 53,598 were Europeans, and they paid in salaries and wages, to the Europeans £10,712,498, and to the Natives and others £3,763,150, making a total salary and wages list of £14,475,648. They used £41,019,680 worth of raw materials, of which £21,844,960 worth was of South African origin, produced articles and work to the value of £70,934,098, of which £29,914,418 was the value added by process of manufacture or treatment. As an indication of the growth of our manufacturing industries it may be interesting to compare certain of the above figures with those of 1915-16, the earliest year for which any detailed information is available:—

	1915-16.	1918-19.
Value of lands, buildings and machinery	£27,551,908	£37,255,978
No. of employees	101,178	143,088
Salaries and wages	8,912,857	14,475,648
Value of materials used	22,315,587	41,019,680
Value of articles produced and work done...	40,434,882	70,934,098
Value added to materials by process of manufacture or treatment...	18,119,295	29,914,418

Not the least interesting feature of the above returns is the apparent reduction in the cost of manufacture in 1918-19, for whereas the value of materials used in that year shows an increase of 84 per cent. over 1915-16, the value added by process of manufacture or treatment records an advance of only 65 per cent.

Turning to the table showing the number of factories engaged in each class of industry we find that by far the largest and most important group is that connected with the manufacture of food, drink, condiments and tobacco. This group numbers 1,659 and is responsible for considerably more than a third of the value of the total industrial output. In the year under notice it used £19,729,235 worth of raw materials, of which £16,778,683 worth was of South African origin, and produced articles to the value of £27,101,545. The next group in number and importance is that comprising the metal, engineering, machinery and cutlery works. This numbers 753, and its output in 1918-19 was valued at £12,962,679. The other chief groups in the order of importance are:—

	Number.	Output
Drugs, chemicals, fertilisers, paints, etc.	107	£5,633,805
Housebuilding	450	4,125,032
Heat, light and power	187	3,742,694
Textiles and clothing	678	2,940,241
Books, printing and binding	289	2,750,106
Leather and leatherware	258	2,664,306
Working in wood	256	2,372,694

Further interesting extracts from the statistics between the years 1915 to 1919 are the following:—

Line 1 indicates the total number of people employed in all the industrial establishments.

Line 2 indicates the wages paid per person employed per year.

Line 3 indicates the value added to materials by process of manufacture per person employed per year.

Line 4 indicates the efficiency of the person employed and represents the value added to materials by process of manufacture per unit of wages paid per person employed.

Line 5 indicates the money spent in raw materials other than South African per one pound spent on raw materials of South African origin.

Comparative Figures.—Union of South Africa.

Indicating all Manufacturing Industries.

	1915-16.	1916-17.	1917-18.	1918-19.
Line 1	101,178	123,842	134,211	143,088
.. 2	£93·9	£84·4	£91·25	£101·1
.. 3	£179·2	£162·8	£197·8	£209·0
.. 4 .. .	£1·921	£1·929	£2·168	£2·068
.. 5	£1·227	£1·040	£·922	£·878

Indicating Metal, Engineering, Machinery and Cutlery Works.

	1915-16.	1916-17.	1917-18.	1918-19.
Line 1	23,617	25,979	31,379	34,736
,, 2	£136·6	£134·9	£132·6	£148·7
,, 3	£165·3	£160·0	£176·2	£191·7
,, 4	£1·21	£1·186	£1·326	£1·289
,, 5	£62·2	£20·61	£12·32	£28·11

It is gratifying to note that the raw materials used in the manufacturing industries are being drawn to an increasing extent from South African supplies. This increasing demand opens up way for more industries and is an indication of future industrial prosperity. The figures show an increased cost of production all round, but this increased cost is also accompanied by an increased production giving rise to an increase in efficiency between 1915 and 1919.

Toronto (Rhodesia).

The report of Toronto (Rhodesia) Syndicate for the two years ended 31st December, 1920, states that the debentures, together with outstanding loans and accrued interest, were paid off in September, 1919. Capital was increased in August, 1919, to £160,000, and 38,910 shares have since been subscribed by shareholders, 85,090 taken by underwriters, and 1,200 allotted as fully paid for commission. Progress has been considerably delayed owing to the difficulty in obtaining some of the material required to complete plant, most of which has now been purchased from neighbouring mines. Total development footage from 1st January, 1920, to 1st March, 1921, is 2,619 feet. Ore reserves remain at 28,983 tons of an estimated value of £45,268, together with 4,000 tons untreated slimes of estimated value of £2,400.

Willoughby's Consolidated.

The report of Willoughby's Consolidated Company for 1920 shows profit of £22,879. The Board has written off £21,542 for loss and depreciation of investments, and after providing for Rhodesian income tax and corporation tax debit balance on profit and loss brought forward is reduced by £543, leaving a debit of £13,396. Property and outlay account stands at £487,543, as compared with £510,319. Eileen Alannah Mine worked continuously, crushing 21,720 tons of ore, value £26,341. The Connemara Mine, which is being worked by tributors, treated 40,720 tons of ore, value about £48,000. At the end of the year reserves were estimated at 55,000 tons, value 6 dwts., and recent development work gives promise of opening up further payable bodies of ore. During the year 88,597 acres of land were sold at an average price of rather more than 10s. per acre. Total land holdings at end of year, after deducting 12,324 acres granted to ex-soldiers under B.S.A. Company's scheme, amounted to 1,133,309 acres. Net revenue from various sources amounted to £24,006.

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The Early Days of Dutoitspan and Bultfontein.

By W. P. Taylor.

Between Kimberley and Dutoitspan, a distance of about two and a half miles, a slight hill of dolerite intervening and going towards the pan, a gentle slope and then, before the claims were pegged, was a long rise—you could not call it a hill or kopje—of soft decomposed limestone. It covered a great expanse, and where it sloped to the south, beyond its walls, its mine walls, there was part of the town, beyond a great vlei of water, and further on was Bultfontein, which occupied a greater rise and was a rounded hill of rotten limestone, and both these hills carried diamonds. They were found in the various claims, and originally they had been found in the *plaster of the farmer's house*. Each mine had its characteristic diamonds: the Dutoitspan diamonds were yellow and inclined to be large; the Bultfontein were rounded and frosty, invariably white, and contained more spots and flaws than stones from any of the other mines and their average size was much smaller. I do not know who found diamonds there first, but from the inception the indications pointed to a large mine. A busy line of carts and wagons came from all sides, and men pitched their tents on every available space, pegging both the hills, digging vigorously and sorting everywhere. Every man you saw was covered with dust and looked as if he had come out of a limekiln. Shortly afterwards the town was roughly laid out, and the inevitable Main Street and Market Square appeared. On the latter there was a morning market. Messrs. Solz and Conolly had the principal store, and next door was Sonnenberg Bros., produce merchants. One of the most active figures in the early history of the Pan was the renowned Ikey, for although the diamond was discovered in '68, Ikey was discovered before that, for prior to the Rush he was in Jacobsdal, and one day an elder of the Church brought wool. This was duly weighed and valued, and certain goods were to be taken in exchange; looking through his counting-house window, he saw the elder put some bars of lead into a bag of coffee, which had just been weighed. Ikey went back, reweighed the coffee, and charged up the extra weight, and as lead was 4d. and coffee 1s. 6d. a lb., it went badly against the elder. Then a thought struck Ikey, and he said to him, "Kindly come into my office." When they were there, he started on him. "Mr. de Klerk," he said, "I saw you put that lead in the coffee, and therefore I reweighed it. Now you are an elder, and I'm going to make an example of you." "Oh, Mr. Sonnenberg, please don't make a scandal; it will kill me, and my family." "Don't you worry," said Ikey, "there'll be no scandal. I'm only going to arrange to give you all goods for the wool." "Oh, thank you, Mr. Sonnenberg, thank you; and I'll just take a whole roll of corduroy." "No you wont," said Ikey, "you've got to take what I give you." "And what's that?" enquired the elder. "Them four rows up there," said Ikey. "And what are they," "Crinolines," said Ikey, "and I might also mention they have been waiting patiently for a customer for years!" The story does not relate what Mrs. de Klerk said when her good man arrived at Klerkfontein with a wagon load of crinolines! Along the streets were innumerable bars and numbers of diamond buyers' offices. One of the earliest buyers there was Henry Barlow Webb, a short, keen, well-groomed Englishman, who spoke French fluently, was very attentive to business, had a delightful sense of humour, and keen sarcasm, he was associated with the Posnos, commanded capital from the start, bought the ownership of the farms the mines were on, and founded the Exploration Company that George Kilgour, who was known as the Pasha of many tales, afterwards directed for a great number of years. Samuel Storestreet, an architect from the Cape, with his handsome family, was there for years, one of the principal buyers, afterwards the inventor of the Davy Parsons Rotary Pan. A fine specimen of an English gentleman, tall, with blond beard, direct in his dealings, and took a deep interest in the town and its welfare. Near him was Captain Finlason, who afterwards developed a small mine called St. Augustines. His nephew was the well-known sportsman and writer in later years. George Manning, who bought large quantities of diamonds for a bank that succumbed. Captain Tim Tyson, of Diamond Field Horse fame, who with Captains Runchman, Donovan, Walter Slatter, J. B. Taylor and others served under Colonel Warren in the Griqua campaign. In the Boer War he attained his colonelcy. One of Rhodes' life friends, and the greatest acquisition to clubmen during Kimberley's days of prosperity. His old partner, Manuel Isaacs, is, I believe, still alive in Bechuanaland. Tim Tyson was a man who loved to see his fellow-man eat well, drink well, and sleep well. An epicure of the first water, early at the market, a judge of good beef, wine, cigars, a lover of the beautiful, and withal a heart of gold. How many that man befriended and cared for during Kimberley's long siege, only the sufferers knew. Tim, as Rhodes's right-hand man, directing distribution of food, was important, for at that time the builder of an Empire was more concerned in the economical cutting up of a sheep than the welding together pieces of the globe.

Dr. Tom Dixon was one of our handsomest men, a first-class cricketer, and one of the best amateur billiard players South Africa ever produced. One of the most genial of men, as a doctor everybody's friend, he led a long, useful life and will never be forgotten in the realms of sport. R. A. Conolly died recently here, with fifty years of honourable Colonial life to his credit. Poor old George Hyland died when the game was very young, an ardent cricketer and one of the smartest men at point I have ever seen. There were the Stows. The head of the family was the geologist and writer and father of Sir F. Phillipson Stow, whose son is to-day a director of De Beers. There were many, many more of those genial faces one encountered in those days at the Pan, for although I never lived there all my recollections of it were of the brightest nature. To-day we say, "When in doubt, go 'no trumps.'" In those days, if Kimberley looked off-coloured, I often took a cab for 2s. to the Pan, bought some diamonds, and made money. It was a fascinating proceding. One saw new faces, it was a day's outing in sunshine, and the profit added materially to one's contentment. The last I remember of the Pan was a day's duck shooting with Jim Benningfield and Charlie Ansell. A stranger appeared in the water and peppered Jim badly. "Hi, mister," he cried, "don't do that again, or I respond." A bit later, Jim got another charge, and then he sent over two barrels from his No. ten bore.

Mr. Allan C. Mather went out scratching his thighs and screaming like seventy bagpipes. It was all settled with drinks later on. Dutoitspan always had a large Dutch population, and there were several Kaffirs working at Bultfontein. There was a story of one of the earliest buyers, one with a racecourse nose, purchasing a stone from one of these claim-holders for £200, and the bank notes he gave the Kaffir were the nice, clean advertisements he had collected out of Huntley and Palmer's biscuit tins. They said he got his first start from that purchase, and his friends were wonderfully impressed at his smartness. There wasn't much sympathy with the Kaffir, for the consensus of opinion was Kaffirs should not have claims. The working of Dutoitspan and Bultfontein did not go ahead like De Beers and Kimberley. Kimberley, in fact, set the pace, De Beers came second, and both these came to a great slowing off when they struck springs and became flooded. It was then that Cecil Rhodes first came forward as a business man and secured contracts to pump out the water, all of which I will relate in due time. But diggers at the Pan and Bultfontein, sorted great mountains of gravel on their claims, or any one else's claims, and there was seemingly no order. The mines were in a terrible mess, blocks of ground sticking up with a mountain of debris on them, and, just before the Rotary pan came in, the position seemed hopeless. Here and there some well-to-do digger worked his claim cleanly and progressed, but nearly all the small holders messed about and did no good. The washing mania caused a rush on to the rich debris of Kimberley and De Beers, and eventually systematic working by Sir Joseph Robinson and H. B. Wallis and others at the Pan pointed the way for a new era and eventually its growth on a scale so vast that individuals were eliminated. With the elimination of the individual went much of early sentiment. You may get something interesting out of the doings of numbers of people whose excitements came from discoveries that gave individual enrichments; but the iron and steel of engines and machines carry little sentiment, and the Kopje Walloper died with the elimination of the individual digger. Romance, what there was of it, was attached to the earliest men: afterwards it centred down to the few characters that remained outstanding; but the human part of that great movement had its best colourings in the strange mass that collected and laid out its first life. Let me say something of the streets and roads. The road between Kimberley and the Pan was of red sand, with here and there a natural foundation of dolerite rock. For many years nothing was ever done to it, and to its credit, be it said, it maintained itself. It was not safe at night, and many a capsize occurred through striking boulders piled along its sides, but it served its purpose. In the streets of the Pan and Bultfontein mine debris was thrown, churned into soft, impalpable limey powder, which rose in a cloud when there was wind, and invaded your mouth and nostrils, obliterated all vestige of sight and covered floors and furniture with a thick coating, which, however, did no damage, and then when it rained the town was a mass of soft, pulpy mud. I have known people stay in bed for two or three days to avoid walking in the mud. I must plead guilty of getting in a supply of novels and doing the same thing myself, and looking back I can't see that anything else could have been done. It is difficult to paint these old-time pictures at the distance, but there is the beginning of Dutoitspan and Bultfontein. Much has been forgotten, but in the sunshine of the past these mines came, as the first stepping-stone from the old River Diggings to the great Kimberley and De Beers mines, which set their seal on the commercial extraction of the gem. How Kimberley Mine was discovered, as I then knew it, I will tell at another time. It is not possible to ever get interest properly awakened in some dead thing. No pen could put the proper vitality into this picture, the introduction of figures speaking vernacular would lend much, but I can only cast the glamour of the gem upon the paper; throughout those days the unforeseen happened incessantly. Every day, every hour, somebody somewhere was unearthing a stone; sometimes it was a large one, and then the joyful news was sent off home and the Colonial papers published columns about it. Affluence was becoming apparent, but motor-cars and other latter-day luxuries were not yet born. One picture you could frequently see was two or three men with great beards, a pipe in each mouth, hands in trousers pockets, slowly wending their way to a buyer's office. That meant they had found a diamond. Then the buyer and the sellers going to the nearest bar. That meant they had sold the diamond. The last scene the finders rolling out of the bar, rosy and affectionate, holding on to anything, one another's necks, or the verandah post, full of untold happiness and the dop of the day. That meant the first effects of their new-born wealth.

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Rock Drill Investigations on the Rand.

In the course of his inaugural address at the S.A. Institution of Engineers, Mr. R. C. Atkinson said:—Nearly two years ago, to be precise, in September, 1919, investigations were commenced with a view to determining the relative merits of the various patterns of rock drills, and to collect data relating to the drill steel in use on the mines. Later the field of investigation was extended to include:—

Jackhammer rigs.

Systems in vogue for bringing drills up for repair.

Testing for efficiency after repair.

Systems of issuing drill steel.

Methods of shanking, tempering, etc.

Tests with solid and hollow steel.

Amount of dust created by different drills and steels

Relative merits of water attachments for reciprocating machines.

And a host of other minor but important considerations in connection with rock drilling and the breaking of ground generally.

Different Opinions.

Preliminary investigations in connection with rock drills and drill steel showed that there was considerable divergence of opinion regarding the most efficient pattern of machine and the most economical size of hole. It was also found that reliable data from which one could settle such important questions were not obtainable, and that the subject generally offered opportunities of effecting important economies.

Working Costs.

It is generally known that about 70 per cent. of the working expenses of a mine are incurred underground, but it is not often realised that the operation of drilling holes involves a greater expenditure than any other individual operation in the mine, either on the surface or underground. This is shown to be the case by the following comparison of the cost of the more important operations prepared from the statistics of one of the mines in the central area, which, whilst it is recognised that the percentage may vary on different mines—may generally be accepted as giving a fair indication of the relative costs of the various operations.

Rock drilling (excluding blasting), 20 per cent. of total working costs; shovelling ,and tramming, 15 per cent. of total working costs; total reduction costs, 14 per cent. of total working costs; winding, 10 per cent. of total working costs; pumping, 3 per cent. of total working costs.

The first point to be noticed as contributing to the high cost of rock drilling is the remarkably small proportion of the shift that is available for drilling. This is found to be about 3½ hours, of which the machine is actually in operation for only about 2 hours. There is no doubt that the drilling time, upon which the output of any mine directly depends, could be appreciably increased by a re-organisation of the underground shifts. In some cases such re-organisation has been suggested by the management, but has been turned down by the advisers of the very men whom it would benefit most, thereby handicapping the industry and helping to close down mines, to the detriment of mine workers themselves, and the trading community at large, who are dependent on the mines in no less degree.

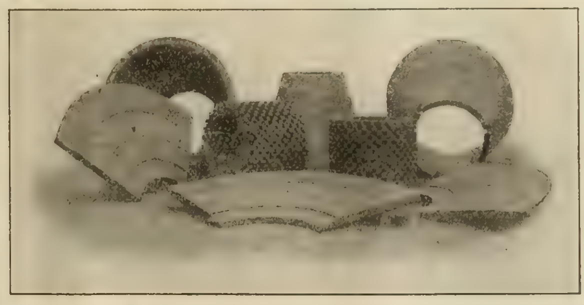
A Special Investigation.

It was recognised by all concerned that the magnitude of the investigations were such that the work could not be dealt with by anyone or even a number of men during the routine of their ordinary daily labours, and that it would be necessary to have the greatest possible collaboration, more especially of the mine managers and their staffs, in order to carry through the investigations to a successful conclusion. In order to effect this a strong and representative Committee of Mining Consulting Engineers, Mine Managers and Mechanical Engineers was formed, who met frequently in committee, and also at the face, in order to discuss ways and means and to bring the benefit of their combined experience to bear on the various tests made.

As far as the operation of the machines underground was concerned, the precaution was taken of having the machines operated under the constant supervision of someone who could be relied upon to conduct the tests without prejudice, and who had the necessary training for experimental work, so that each machine could be operated under parallel conditions. (This resulted in the appointment of a mining man who, besides being a Royal School of Mines man, "London," has had considerable and varied underground experience, both practical and in an official capacity.)

The operator was assisted by observers from the Miners' Training School one to each machine who recorded detailed observations continuously throughout the shift, together with the usual complement of native operators and drill carriers.

It is not within my province this evening to give you results of these investigations. That, I trust, will be done at no distant date—in the form of a paper—by the gentlemen who were responsible for the work, and who carried out the investigations, which, by the way, are as



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yet far from completed.. I may, however, I hope, without trespassing on their preserves, make brief reference to a few outstanding points resulting from these investigations.

Effect of the War.

In the matter of rock drills, as in many other lines, the War period necessitated the purchase and use of any and every type of machine, or steel which happened to be available, with the result that we found ourselves, at the end of this period, in the undesirable position of having a great many different types of machines, many of which were already obsolete when the investigations were commenced. It is not necessary to point out the desirability of altering this at the earliest possible date, in order to reduce the unusual and inflated costs which were naturally caused by the great variety of spares to be kept, and the lack of standardisation of machines.

The observations in connection with the drill steel disclosed the fact that much was left to be desired as regards the correct heating and tempering of the drills, and that a considerable percentage sent underground was either burnt, brittle or soft.

The examination of drills after use showed that on some of the mines the faulty bits were between 20 per cent. to 30 per cent. of the total used. This naturally reduces the drilling efficiency, and it is conceivable that a shortage of drills might occur during the drilling periods. The methods of tempering are, perforce, rough and ready, but it was proved that a great improvement in quality of bits could be effected by closer supervision and systematic inspection of the drills before and after use, and in most cases where the procedure recommended has been adopted, the proportion of faulty bits is seldom more than 7 per cent.

Drill Bits.

(The correct gauging of drill bits was found to be another most important factor in the drilling efficiencies obtained; owing to inaccurate gauging, the volume of holes drilled is often larger than necessary, with the consequent decrease in the speed of drilling. It was conclusively proved that if correct differences in the various sized drills were adopted and attained by accurate gauging, the volume of holes, in many cases, could be reduced by as much as 25 per cent., and the drilling speed increased in about the same ratio. In these days of universal machine sharpening, with dollies and dies accurately machined, there is surely little excuse for large errors in differences, and this should easily be kept within the limit of say 1-16in. This may entail a slight increase in the cost of sharpening, but such extra cost would be more than offset by the better work done by the miner.

Interesting Tests.

I have touched the fringe of the work covered by the investigations. The tests to ascertain the amount of dust produced by the machines under varying conditions are of absorbing interest. but I have no doubt this will be fully dealt with by the right man at the right time. My object in drawing attention to this investigation in a brief manner is to show the enormous amount of work such a programme entailed, and the expenditure it involved, and more particularly the hope that the average mine worker may be brought to realise that apart from the ordinary working costs entailed in the winning of gold, heavy extraordinary expenditures are continually being incurred—necessitating capital—in order to determine, from time to time, the best appliances to adopt, not only to decrease worknig costs and thereby enable lower grades to be worked, but also with a view to improving the working conditions of the man at the wheel.

What is probably the only corundum mine so far worked in South Africa is being actively developed at Bandolierkop by Messrs. Tom Setterfield and Chas. Chamberlain. These gentlemen have erected a ten-stamp battery, and their reduction plant comprises crushers, Wilfley tables, etc. It is their intention to produce various grades of corundum.

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The Far East Rand.

MR. R. R. MABSON ASKS FOR SPECIAL ENQUIRY—CORRESPONDENCE WITH THE GOVERNMENT MINING ENGINEER.

The last issue to hand of the *Stock Exchange Gazette* (London) has the following:—

In December last I visited South Africa as Special Commissioner of the *Stock Exchange Gazette* to investigate the position as to the Far Eastern Rand. In respect of the northern part of this great gold-bearing basin of reef formation the experiences of the past have disclosed some very favourable features as to companies possessing payable areas from outcrop at Modderfontein to Springs—deep level—a distance north to south of seven or eight miles. As to area south of Springs there is a stretch of about the same distance of area not efficiently tested as to whether or not it contains payable reef. For a further short distance two companies in the neighbourhood of the Nigel have for many years been producing gold, but the area to south-west of the Nigel along the strike of reef, and more particularly in the region of Heidelberg Township, still remains to be proved, and about the nature of the reef formation there is keen controversy.

Two articles I wrote from Johannesburg late in February and early in March this year that appeared in the *Stock Exchange Gazette*—Article XIV., May 5, p. 908, and Article XV., p. 955, May 12—dealt more particularly with this southern portion of the Far Eastern Rand.

As will be seen below official exception is taken to the statements in Article XV.

Office of the Government Mining Engineer
(Mines Department),
Johannesburg, June 7, 1921.

R. R. Mabson, Esq., F.S.S.

Dear Mr. Mabson,—I am receiving copies of the *Stock Exchange Gazette* containing the series of articles by you on the Far Eastern Rand. I desire to express my thanks for your courtesy in having these sent to me, and the perusal of the weekly article is always a matter of interest to me.

In Article No. XV. you have, I think, done the Government a gross injustice, which I am sure you will acknowledge as soon as it is pointed out. You quote the telegram as reading, " The reefs in the Heidelberg district . . . are parts of the Kimberley series and *do not include the Van Ryn Reef*." The telegram actually ran: " The reefs in the Heidelberg district mentioned above are part of the Kimberley series and do not include the Van Ryn Reef." There are no italics, and the words " mentioned above " refer to a previous portion of the telegram which specifically details " certain conglomerate reefs which crop out on the farms—Tulipvlei 13, Klippoortje 222, Heidelberg Town Lands 172, Boschfontein 270, Boschhoek 271, and Mount Arabel 329." You will note the great difference between your reading " reefs in the Heidelberg district " and the *outcrops* of reefs on particular farms which are mentioned by name. Your subsequent criticism is based, to a considerable extent, on the misquotation.

If it is your intention to publish the articles in book form at a later date, I suggest that you take that opportunity of revising Article XV., and for that purpose I enclose a copy of the telegram, which, on every occasion but one that I have seen it mentioned in the Press, has been misquoted. It is not so long that it cannot be quoted in full, or, at all events, correctly, by anyone desiring to criticise it.—Yours faithfully,

(Signed) R. N. Kotze.

Copy of telegram despatched to London March 5, 1920.

" It having come to the notice of the Government of the Union of South Africa that endeavours are being made to raise large sums to exploit certain conglomerate reefs which crop out on the Farms Tulipvlei 13, Klippoortje 228, Heidelberg Town Lands 172, Boschfontein 270, Boschhoek 271, and Mount Arabel 329 in the district of Heidelberg, Transvaal, on the ground that the said reefs include the Van Ryn Reef, and that the term extension of the Far East Rand is being used in connection with the schemes, Government of the Union of South Africa desires make it known that in the opinion of its technical advisers: (1) the term Far East Rand has a definite geographical and geological significance, and the use of the term extension of the Far East Rand for any contiguous area is not warranted; (2) the reefs in the Heidelberg district mentioned above are part of the Kimberley series, and do not include the Van Ryn Reef; (3) the Main Van Ryn and Nigel Reefs are parts of one and the same reef series; (4) the outcrop of the Main Reef does not continue south-east of the Cinderella Mine. In connection with the Nigel Van Ryn Mine, it has been stated in London that the director of the geological survey of the Union expressed admiration of the reef in that mine and wondered that the mine had been abandoned 20 years ago. The director did not express those opinions."

The Government cable of warning made special reference to five very considerable named areas adjoining one another and stretching for a distance of 12 to 13 miles along the line of strike of reefs in the Heidelberg district, from Houtpoort-Tulipvlei to Mount Arabel south-west thereof. The date of dispatch of the warning telegram was March 5, 1920. It is alleged that when issued for publication in the London papers it was dated March 22, and it was further asserted that it appeared the day after Mr. Bleloch sailed for South Africa. It is claimed by Mr. Bleloch and persons associated with him that Mr. Bleloch's visit to London was for the purpose of arranging for the raising of capital to effect developments in the south-eastern part of the Far Eastern Rand, and that arrangements had been fixed up for such provision of capital, part to be applied to property within the 12 miles from Tulipvlei to Mount Arabel.

On publication in London about March 22 of the Government warning, the financial arrangements were summarily cancelled, the markets for the shares of companies were entirely demoralised, and distrust prevailed and still prevails both as to the opinions held respecting the Heidelberg region of 13 miles and properties for an approximate 10 miles of further strike along the reef to the north-east, including the properties of the old-established Nigel and Sub-Nigel companies.

In Article XV., the three dots referred to in Sir Robert Kotze's letter above in the paragraph after " the reefs in the Heidelberg district " were an abbreviation to save the detail of names of the five large areas making up the 13 miles' stretch of reef. The setting out in italics of " do not include the Van Ryn Reef " was my own italicisation; and it was followed a few lines lower down by the paragraph as follows:

> " It is held the wording of the telegram:
>
> ' Are part of Kimberley series and do not include the Van Ryn Reef.'
>
> is directly in conflict with the experience of the field that the Van Ryn Reef underlies Kimberley Reef series in depth. If the existence of Kimberley Reef be admitted, can it be that Van Ryn Reef is non-existent below it? "

I concluded Article XV. with a suggestion that there should be an investigation by a committee of, say, five or seven mining men with Rand experience, including representatives appointed by the Union Government. Also that on this committee no persons who have prominently figured in controversies of recent years should be a member, but provision could be made for their being called upon for evidence.

I understand that a requisition has been addressed to the Government and formulated apparently on the lines of my suggestion.

In a letter dated May 2, 1921, addressed by Mr. W. E. Bleloch to the Secretary of Mines, the following occurs:

Sir, —This is to place on record that at the interview between the Rt. Hon. the Minister of Mines and Industries at Parliament House, Cape Town, on April 20 (1921), at which you were present, the Minister, after hearing my account of the discoveries and facts and the errors of the geological survey, made manifest during the past eight years of work, said that he could not see that it was necessary, in the public interest, to hold an inquiry into the question of the reefs of the Far East Rand . . . I agreed with the Rt. Hon. Minister, who said he would consider in what way inquiry should be instituted."

In a letter to Mr. Bleloch, dated May 6, 1921, the Under-Secretary for Mines and Industries (Johannesburg) wrote:

Sir,—I am directed by the Rt. Hon. the Minister for Mines and Industries to inform you that, after careful consideration, he has come to the conclusion that no good purpose would be served by the appointment of a committee to inquire into the geological controversy.

There exists a keen controversy about the reef series. On the one hand, it is held that both Central and Far East reef series are one and the same, and that the principal payable reef is Main Reef Leader. As to the Central Rand such reef is termed the Main Reef Leader. As to the Far East Rand, it has all along been dubbed Van Ryn Reef. It is contended by certain persons who have studied stratigraphy that the Far East Rand series of reefs is quite distinct from the Central Rand series.

This controversy really is beside the point, which is: Does the Far East Rand contain a payable reef? The answer is: Yes. It is proved so in a very large area in north of the Far East Basin, and a reef is being worked from Modderfontein to Springs. In this area it is overlain by what is termed by the companies Kimberley Reef beds.

As to the south part of the field, *a* reef has been profitably worked at Nigel and Sub Nigel. *A* reef, when portions were crushed and panned in my presence, showed at outcrop gold contents at the Houtpoort Company's ground near Heidelberg.

A small committee of inquiry should be able to ascertain whether or not the outcrop of ore at Houtpoort is as asserted (1) by the one side to be Van Ryn Reef, or whether it is (2), as the Government experts say, Kimberley Reef.

If the answer be (1), good. If it be (2), the outcrop of Van Ryn Reef would be south of Houtpoort, and add to the total Far East Rand Reef area. But below the Kimberley it is admitted by both contestants there exists Van Ryn Reef.

Similarly, east of Nigel, whether the Southern Van Ryn's developments from outcrop disclose payable reef.

I regret it should be interpreted that I have done any injustice. I have throughout sought to arrive at the true position, and hold no brief for either party.

R. Mabson.

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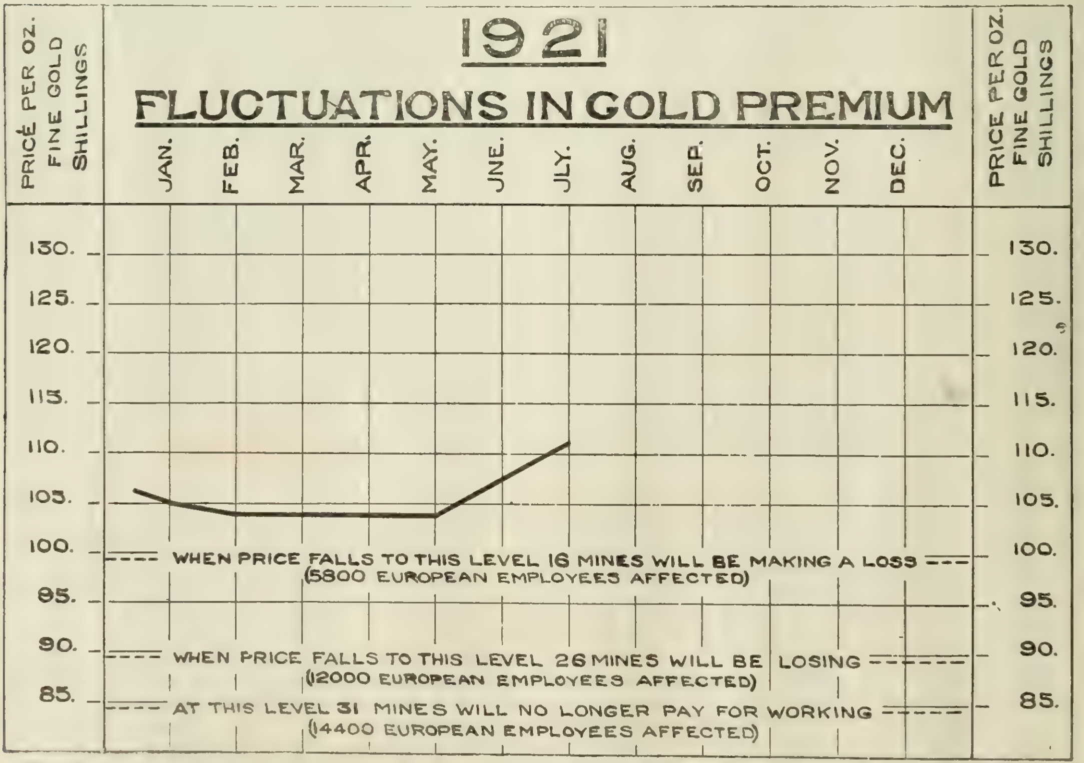

The above graph shows the fluctuations in the gold premium during the current year. The reduction in wages, made since the above was drawn will, of course, affect the three lower lines.

Tungsten in South Africa.

From a report published by the Imperial Mineral Resources Bureau we extract the following:—Both wolfram and scheelite are widely distributed throughout Rhodesia, and occur in some quantity at several localities. The former mineral has been worked at Essexvale more or less continuously since 1905, and has also been found in the Sabi valley, while scheelite was first worked in 1906, near Gatooma, where it occurs in a quartz reef in gneissose granite. The Essexvale mineral is said to be the manganiferous variety (hübnerite), and to be free from impurities.

According to A. E. V. Zealley, the Essexvale tungsten ore deposits include sixteen distinct " reefs," eleven of which have had a little work done on them from time to time. They consist of greisen, composed chiefly of mica, fluorite, topaz, and secondary felspar. The " reefs " have long strike extensions up to a distance of one mile, and average three feet in width. The country rock is a coarse-textured and massive variety of hornblende-granite. A stockwork deposit of " streaks and seams of aplite containing gashes of quartz " scattered sporadically throughout a mass of hornblende-granite is also described, in which the aplite has been greisenized to varying degrees, with the production of wolfram and other minerals. Wolfram and scheelite are also won from the detrital ground or " rubble " in the vicinity of the outcrops, which are worked by hand or by means of rotary washers.

Production of Tungsten Concentrates in Southern Rhodesia.

	Wolframite.		Scheelite.		Total.	
Year.	Quantity (long tons).	Value £	Quantity (long tons).	Value £	Quantity (long tons).	Value £
1913	—	—	—	—	4	427
1914	—	—	—	—	—	—
1915	—	—	—	—	—	—
1916	3	466	—	—	3	466
1917	11	2,070	—	—	11	2,070
1918	10	1,708	23	3,699	33	5,407
1919	—	—	—	—	18	5,103

Union of South Africa.

Tungsten mining in South Africa is of little significance, " tungsten ore " figuring in the Customs returns for the first time in 1916. It is probable, however, that some of the tin concentrates exported in earlier years contained either wolfram or scheelite. Up to the present time these ores have not been mined for themselves, but have been obtained incidentally in association with cassiterite.

A considerable quantity of wolfram is reported to occur with cassiterite in the quartz reefs and granite at Kuils River in the Cape Province. In the Good Hope Mine the amount of wolfram in the concentrates is reported to be sometimes nearly equal to that of cassiterite.

Scheelite occurs at many places, notably in the Stavoren tin mines, where some of the lodes are fairly rich; also near Leydsdorp, in the Transvaal, where the source of the mineral has not yet been traced, and near Stanger, in Natal.

Production of Tungsten Concentrates in the Union of South Africa.

Year.	Quantity (long tons).	Value £
1915	3	—
1916	8	871
1917	8	1,551
1918	17	3,647
1919	4	699

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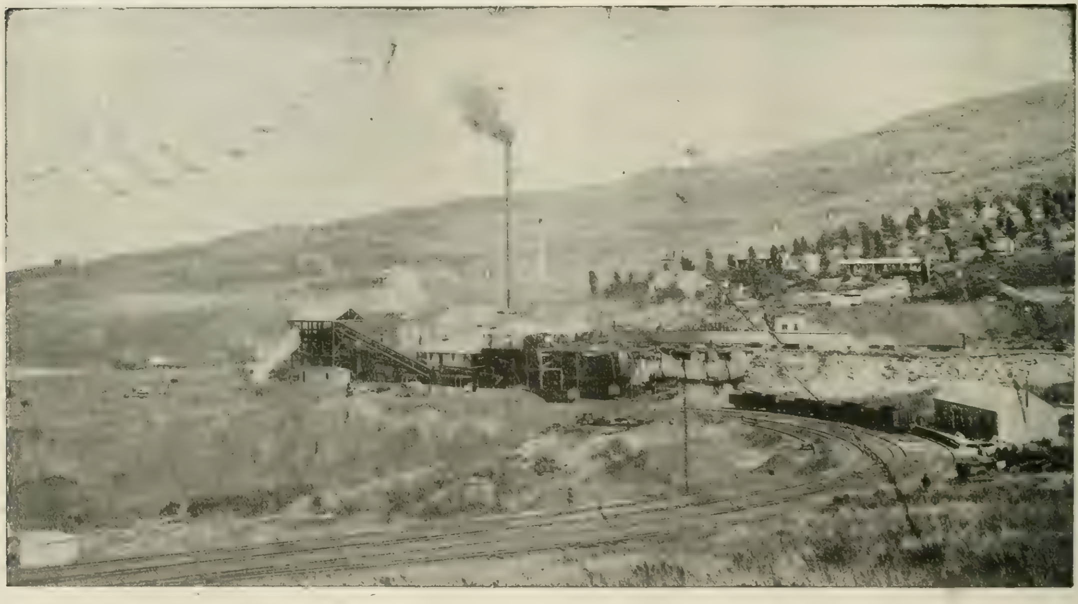
The Appalling Wastage of Coal.—II.

THE LOSS TO SOUTH AFRICA—LESSONS FROM OTHER COUNTRIES—NEED FOR CO-OPERATION BETWEEN COLLIERIES AND GOVERNMENT.

One of the most important matters dealt with in our Special Coal Number—which is now being rapidly sold out—is that of the wastage of coal in all its phases. The following is a further instalment of an article redirecting attention to this vital and urgent question.

Production of Electrical Power

(1) This is the means by which at present a large quantity of dump coal is disposed of, *e.g.*, by the Victoria Falls Power Company. An increased consumption in this direction might be possible if other concerns followed their example, but a very considerable increase could scarcely be anticipated except in connection with increased demand for the power produced. This would arise in connection with the electrification of railways serving the coal district. Any factor tending to cheapen the cost of power for this purpose would, of course, facilitate the scheme, and it would, therefore, be advisable not to follow the present practice of burning the coal direct under the boilers, by which no by-products are recovered, but to burn in producers [possibly in conjunction with method (3)] and so produce concurrently with fuel gas, a valuable amount of ammonium sulphate and some tar.



A Natal Colliery.

It has been demonstrated in South Africa (*e.g.*, at Vryheid) that these "by-products" alone are capable of yielding a profit, and it is obvious, therefore, that power would be very cheaply produced indeed if the outlet for it existed.

The gas could be used to fire boilers, as in current practice at blast furnaces and coke plants, but it is rather more efficiently employed in large gas-engines, as well as for general heating purposes. Power would thus be generated probably for less than ¼d. per unit.

When cheap power thus becomes available industries utilising it quickly arise, and if the demand should, in present industrial centres such as the Rand, increase beyond the capacity of existing plants, such centres are within the range of possible power distribution from the coalfields.

Furthermore, the quantity of round coal required would be reduced by the railway ceasing to need it for locomotive use where electrification took place, and this in turn would diminish the concurrent production of small.

Nevertheless, power requirements, even with the better utilisation forecasted, would doubtless increase so as to call for at least the present output, and the proposed iron and steel industry will prove another factor operating in the same direction.

Possibilities of Briquetting.

(2) From the national point of view the briquetting of the small coal would offer an immediate prospect of utilising that part of the small coal not used for boiler firing to replace round coal both in domestic and industrial firing, and so diminish the amount of round coal burned. This, in turn, would reduce the amount of coal mined and small produced, so that all the coal mined would be utilised, or, in other words, no more would be mined than could be utilised.

But dump coal is not, in our experience, of as good quality as the round or even run-of-mine coal from South African collieries.

Briquetting it would, therefore, yield a fuel of lower value, and the difference in price between briquettes and round coal would have to be considerable to attract consumers, though, on the other hand, they may store better

In view of the fact that round coal averages, say, 5s. 6d. per ton, and the cost of briquetting has been given, under favourable conditions, in the United States of America as 20 cents per ton—presumably bare working cost—the commercial possibilities at present seem rather doubtful, the cost of briquetting here being scarcely likely to be less than 4s. per ton.

About 6 per cent. of pitch is required as a binder, and, if imported pitch had to be used, the cost of this amount would scarcely add less than 10s. per ton, and so render the cost of briquetting prohibitive. Even if locally produced as a by-product of coke works with tar distilling plant, it would scarcely be obtainable at less than £2 per ton, and at that price would add nearly 2s. 6d. per ton.

(3) Carbonisation in retorts or ovens would, in general, only be suitable if the carbonised residue could be readily utilised, though even by this method it might be possible, in view of the high local prices of other by-products, to make profits, even when it, and the gas, are wasted.

Certain Transvaal coals will cake,[*] and produce a coke which, both from the chemical and mechanical standpoints, would be satisfactory for blast furnace or foundry, but, unfortunately, the majority, as far as is at present known, are either non-caking or do not produce a satisfactory coke.

Moreover, the dump coal alone will not produce such a good coke as run-of-mine, and it follows that the proportion of dump coal which can be utilised for coke in the prospective iron industry may require 150,000 tons of coal per annum.

It is true that the carbonised residue, even if non-coking, could then be used for production of power gas, via gas producer, and to a limited extent for other purposes, such as smokeless domestic firing, but the present power requirements, unless the collieries were to compete with their present customers, would not use more than a fraction of the coal available. However, in connection with the electrification of railways and the proposed iron and steel industry, outlets would be found.

The former would require a large power production, while the latter will need fuel gas for furnaces. It will be seen, therefore, that of the methods suggested—

(1) Depends entirely on a greatly increased demand for cheap electrical power;
(2) Is unlikely to be applicable, on account of cost;
(3) Apparently offers a promising field for investigation. The by-products, tar, pitch, benzol, ammonia sulphate, etc., would command remunerative prices locally, and there is always a world market in addition.

The gas and carbonised residue could be used for power production, and further ammonia recovery it, and when, the demand arose, and would enable it to be very cheaply supplied, but so much of the residue as forms a usable furnace coke would be sold as such.

It may also be noted in connection with (1) that if the coal, instead of being burned under boilers as usual at present, is first gasified in producers, the by-products obtainable may render the operation profitable, even in the absence of a power scheme, which would doubtless materialise at a later date.

Estimates made by Mr. S. B. Bilbrough[†], in a paper before the Institute of Engineers in 1916, may be quoted here, no allowance being made for value of gas produced.

Particulars of Plant Retorting 200 Tons per Day for Tar and its Distillates with Ammonia Recovery from Gases and all Coke.

Sales	Per ton of coal 2,000lb. s.	d.	Per 72,000 tons per year. £
Tar and its distillates, 12 gals. at 7s.	12	0	43,200
Sulphate from gases, and all coke at 100lb. per ton	12	6	45,000
	24.5	0	£88,200

Expenses	Per ton of coal. s.	d.	Per 72,000 tons per year. £
Duff coal	2	0	7,200
Working expenses—Retort plant . .	3	0	10,800
Working expenses—Sulphate plant	5.3	0	19,200
Depreciation 7 per cent. on £130,000	2.5	0	9,100
	12 8	0	£46,300
Profit	11.7	0	£41,900

Capital Outlay—

Retorting plant	£60,000
Producers and ammonia plant	70,000
Working capital and extras	70,000
	£200,000

Rate of profit, 21 per cent. Return per ton of coal, 13·7s.

He also estimated that, by burning the coal in producers at the rate of 200,000 tons per year, and wasting the gas, the return per ton of coal with ammonium sulphate at £14 per ton would be 8s. Sufficient to yield 18 per cent on a capital of £300,000, or 25 per cent. at £16 per ton. (War price has been as much as £43.).—From the *Journal of Industries*

(To be Continued.)

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[*] See Iron and Steel in the Union of South Africa By Prof G. H. Stanley, *Journal of Industries*, December, 1917.

[†] The Prospects of the Carbonisation of Coal, with By-products Recovery, as a South African Industry By S B Bilbrough, October, 1916

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EDITORIAL.

GENERAL MINING AFFAIRS.

Mr. Leopold Albu presided at the annual meeting of the General Mining Corporation on Thursday, in the absence of the Chairman, Sir George Albu. The finances of the Corporation were reviewed in our last issue, and we purpose here merely to deal with the more general matters touched on by the Acting Chairman. Like all who have been absent from this country for some years, Mr. Leopold Albu is surprised at the industrial progress it has made in his absence. The changes which have taken place in the past fifteen years he finds truly amazing, though he admits that the War has greatly contributed to that expansion. He thinks that "South Africa is bound to become one of the great grain and meat producers of the world." On the other hand, however, Mr. Albu is disappointed to find that the gold industry has come off so badly through the War; and he deplores the fact that the existence of many mines is threatened as a result of the fatal combination of high costs and low efficiency. He puts on record the solemn warning that "unless wages are considerably reduced and pre-War efficiency restored you will witness, within a short period, the gradual closing down of mines to-day producing." The inefficiency of labour, he holds, is responsible more than anything else for the extraordinarily high costs prevailing on the Rand. Mr. Albu welcomes the latest agreement between the Chamber of Mines and the men, as forming a good starting point for that campaign of economy and efficiency which is so essential to the successful working of the gold mining industry. In this connection he declares it is very necessary to do away with, or drastically modify the present form of underground contract which allows miners to earn accidentally very large sums of money, often quite out of proportion to the services rendered. For obvious reasons this state of affairs makes it difficult to get really good men to accept official appointments underground, so that while the present contract system may give good results in individual working places, "it no doubt tends, on the whole, to decrease efficiency." Turning to native labour, Mr. Albu puts the case for the relaxation of the present restrictions on native effort very clearly and forcibly. "In future," he declares, "the native, as his intelligence permits, must be given more responsible work in order to develop the resources of this country economically." Mr. Albu adds: "I feel certain that the abolition of the colour bar would scarcely affect the white man at the present moment, and would in the end, by enlarging the sphere of employment, provide work for many more than are employed at present." If the labour unions would only take this long view, Mr. Albu is convinced their members would come to the conclusion that this artificial barrier is really detrimental to their own best interests, as it undoubtedly is to the interests of the country at large. It will be seen that Mr. Albu's views on these vital questions of white and black labour conditions in this country coincide with those of most other thoughtful observers. In the years of his absence from the Rand he has remained a student of our economic affairs, and the fact of his being at some distance has merely enabled him to see our problems with greater clarity. We should all be grateful to the Acting Chairman of the General Mining Corporation—whose full speech appears elsewhere in this issue—for reminding us so opportunely of some of the basic facts of Rand industrial progress and reform.

THE BANKING OUTLOOK.

At the annual meeting of the Standard Bank, held in London the other day, the chairman, Mr. Wm. Smart, had several interesting things to say regarding the general business outlook for South Africa. Touching upon the Currency and Reserve Bank Bill, and the consequent establishment of the Central Reserve Bank, the chairman pointed out that the scheme was framed closely on the lines of the Federal Reserve system of the United States, "but it may be doubtful," he added, "whether a system devised for the control of reserve in a country with some thousands of banks will succeed in one with a wide and highly centralised banking system almost entirely under the control of two large banks." At the same time he made it clear that so far as the Standard Bank was concerned, the management were doing their best to co-operate with the new institution. Reference was also made to the provision under the Currency and Banking Act for the issue by the Treasury of gold certificates against gold coin or bullion, these certificates to be inconvertible until June 30, 1923, so long as the market price of gold exceeds the mint price of £3 10s. 7½d. per ounce, which should prevent the export of gold coin from South Africa when its intrinsic value is in excess of its nominal value. The issue would also afford protection, at least for the present, against a repetition of the expensive procedure whereby the Banks were called upon last year to purchase and import gold coin at market price to make good the deficiency caused by the illicit export of sovereigns which the high premium obtainable in India and elsewhere induced. Dealing with the trade position, the chairman contrasted the circumstances when the year opened with the rapid reversal later on, and showed how impossible it was, in face of such fluctuations, to finance imports and exports with the ease and smooth working enjoyed in the past. In the first place it was necessary to raise the rates of exchange owing to the shrinkage in imports, and in order to assist in adjusting the trade balance. Then, when—partly as a result of the high rates of exchange—imports considerably increased, the influx coincided with a rapid contraction of exports brought about by the sudden fall in the prices of wool and other produce, and again the exchange had to be adjusted to meet the drain which the Banks experienced on their London funds. It is satisfactory to note that the steps taken by the Banks have had the desired effect. There is no need to recapitulate the chairman's statistical retrospect of the country's trade returns for 1920 as compared with the previous year, with its special references to the burdens which have been imposed upon the gold industry owing to heavy working costs, due in the main to higher wages necessitated by increased cost of living, together with the extent to which the diamond industry has suffered from the adverse conditions of recent months. With regard to the outlook, the fact was frankly recognised that the immediate future is full of uncertainty, but the chairman did not fail to emphasise South Africa's remarkable recuperative powers. Given a recovery in the various markets for its produce, every confidence was expressed that a country of such boundless resources would rapidly respond, and be one of the first to reap the benefit of more normal world conditions.

Notes & News.

Our Busy Man's Page.

Owing to the non-arrival of the mail boat this week, matter for our Busy Man's Page is unavoidably held over.

* * * *

Randfontein Improvement.

Randfontein Estates have been a feature of the week, improving to 19s. 3d. on some good buying. The improving position at the Central mines is, of course, responsible for the increased interest in the Estates, coupled with the rumours that the gold premium is to be stabilized.

* * * *

The Diamond Trade.

The following message to the London *Daily Telegraph* from its financial correspondent in Paris was published in mail week by the paper named:—

The trade in diamonds is affected, apart from general causes consequent on the world-wide crisis, by a very special circumstance which has caused practically total stagnation in the diamond market. This is attributed here in expert quarters to the importation into Western Europe of the many diamonds stolen in Russia under Bolshevik rule. In the first instance, it is alleged that the importation was made into England by way of Reval and Stockholm. This went on, according to the French assertion, until the day when French diamond merchants came to the conclusion that it was superfluous to pay tribute to English trade in precious stones, and began to operate directly in Russia on their own account, passing over the heads of the English intermediaries. Scarcely a week passes without the market being flooded with jewels sold at low prices in such a way that all other transactions in the trade are stopped by this competition, against which reaction is impossible. A dealer remarked that a diamond merchant must either become a receiver of stolen goods or else give up doing any business. Certain diamond specialists fear that if they should deal at a certain low price, quite apart from the scruples which might urge them to refrain, a new lot of precious stones might be dumped on the market at a still lower price, and therefore ruinous to them. It is believed here generally that it will be only possible to resume bona-fide dealings in diamonds when the large stock of these gems stolen in Russia shall have been completely exhausted.

* * * *

The Future of Gold.

Mr. F. H. Hamilton, speaking at the H.E. proprietary meeting in London recently, had something of interest to say regarding the gold premium and the future of the gold industry.

"I should be the last person to venture any dogmatic opinion upon a question the factors of which are so complex and confused," he said. "I may, perhaps, be permitted to state, however, that I believe the time when the gold industry will come into its own again is not at all remote. A very distinct change of sentiment is already apparent. It is, I think, to-day pretty generally recognised that a policy of artificial deflation which does not correspond with or represent an increase of commodities is just as disastrous as the contrary policy of sudden inflation by the wholesale manufacture of credit. Each of these policies has been tried, and as it happens the gold-mining industry has suffered almost equally from both. When the pound declined in value the cost of all material was higher, and labour on the Rand seized the opportunity to raise wages. When, again, our own Treasury attempted to deflate currency and to raise the relative value of the pound the premium on gold declined, but wages remained at the old high level. The consequence is that the gold industry was bled at both ends. It retaliated in the only way open to it by falling into a decline, not because it was sulky, but because, whatever advanced politicians may say to the contrary, an industry cannot pay more out than it has in it. One result is that the production of gold all over the world fell from about £93,000,000 in 1914 to £73,000,000 in 1919, a reduction of over 20 per cent. Another is that many of the low-grade mines on the Rand have been living from hand to mouth, and white labour has been faced with this dilemma, that unless a reduction corresponding to some extent to the decreased prices of commodities is made many mines will be forced to close down and a large amount of unemployment will ensue, which will ultimately force down wages. It would almost seem that to-day the tide has turned. There are signs of a disposition on the part of white labour to meet the situation by reasonable concessions, and a certain measure of relief in this direction may be hoped for which, of course, would be reflected in working costs. The price of mining material has already come down. Then there is the question of the gold premium, and here, too, the industry seems likely to benefit. The idea seems at one time to have gained currency that this gold premium as measured by the £ is quite a temporary phenomenon and that before long it will disappear, and that it will be possible for the country to return permanently to an effective gold standard. It would be out of place at this meeting to discuss the strong and, I think, convincing reasons that exist to the contrary. I will merely content myself by stating my own confident belief that for the next ten years, and probably for a much longer period, the £ will be at a discount relatively to gold, that any attempt within that period which this country may make artificially to deflate to the gold level must fail, and, finally, that it it could succeed the political consequences would be of a disastrous character. If this view is correct it follows that gold mining has already passed its worst period, and that we are likely within the near future to see a much larger margin of profit on the medium grade mines."

* * * *

Transvaal and Natal Collieries.

In the King's Bench Division, in mail week, counsel mentioned to Mr. Justice Shearman the non-jury case of Transvaal and Natal Collieries, Ltd., v. Bowater. Mr. Sutcliffe, for plaintiffs, said the action, which was based upon an agreement to subscribe for shares, had been settled.

Mr. Bowater, the defendant, had agreed to pay £39,000 in five sums, beginning with £14,000, and the company would allot to him fully-paid shares of the value of the payments he was to make as and when they were made. His lordship directed a stay of proceedings accordingly.

* * * *

Transvaal Gold Production for July.

The tonnage milled during July was 2,010.236. showing an increase of 43.887 tons on the corresponding figures for June. The yield per ton of ore milled was lower this month by .068 dwts., but notwithstanding this fact, the rise in the gold premium, and the lower working costs of 25s. 7d. per ton as compared with 25s. 10d. for June, combined with the increased tonnage crushed during July, have increased the profit per ton from 10s. for June to 11s. 7d. for July This increase on the total tonnage crushed amounted to £183.796. The outside districts also show favourable increases:—

	July.	Increase.
Tonnage milled	29,640	1,165
Yield, dwts. per ton ...	7.67	*.432
Working Costs per ton ...	36/7	*9d
Profits per ton	6/10	2d.
Total Profit	£10,136	£617

* Decrease.

The monthly progressive figures for the Transvaal are as follows:—

	June.	July.
Tons Milled	1,994,824	2,039,876
Total Yield fine ozs...	678,490	689,555
Working Revenue ...	£3,583,077	£3,800,590
Working Costs ...	£2,598,789	£2,626,889
Working Profit ...	£989,288	£1,173,701

In these analyses the realisable value of gold (irrespective of realisation charges) has been assumed as follows:—

June	£5.375
July	£5.625

The working costs have decreased by 3 pence per ton, while the gold premium has advanced by £.25 per fine ounce, or when estimated on tonnage milled by 19,89 pence. The greater portion of the increased profit for July is thus due to the rise in the gold premium. This clearly shows to what extent the working of our gold mines is affected by the fluctuations of the value of gold. Such a position is rather unstable, and can only be strengthened by the lowering of working costs. It is gratifying to note that working costs were lower on the Rand during July than any other month this year, and also below the average for 1920.

* * * *

War Against Accidents and Miners' Phthisis.

Mr. A. M. Anderson, Ambulance Organiser to the Prevention of Accidents Committee of the Rand Mutual, who is at present going round the mines preaching the gospel of "Safety," delivered a lecture on the evening of the 18th instant at the Brakpan Mines, Limited. Mr. C. B. Brodigan, general manager of the mine, presided, and there was a large and appreciative audience. The lecturer briefly outlined the various causes of accidents and illustrated each by referring to striking cases of negligence which had come to his notice. He strongly emphasised the necessity for a knowledge of first aid, and gave instances where lives had been lost which might have been saved had those who were willing to assist an elementary knowledge of the subject. Mr. Brodigan made a special appeal to all concerned to assist in this most deserving humanitarian movement, and commented that it was particularly pleasing to note the interest recently taken therein on his mine. Two teams had been entered for the forthcoming district ambulance competitions, and he wished them every success. The lecture was preceded by a safety cinema film depicting some of the ways in which accidents occur underground and by a series of coloured safety slides, and was followed by "The Dust that Kills" film illustrating the various possible causes of miners' phthisis, its prevention and cure.

Flotation.

Those interested in the developments of ore dressing methods will have noted with a certain amount of surprise the tremendous advances which have been made in the flotation process within the last dozen years or more. No modern ore dressing plant treating copper, lead, zinc, and a multitude of other ores is complete without its flotation units. They are particularly suitable for treating ores of low grade, and from an American exchange we take the following: "No reasonable doubt can exist as to the successful application of flotation to our ores. The process will enable reworking of the dumps which it is estimated can produce $55,000 more than enough to cover the cost of the flotation plant." The high grade ore deposits are gradually being worked out and metallurgical practice tends towards treating larger tonnages of lower grade material. This movement is gradually but surely establishing the field for the flotation process which has proved so successful on low-grade tailings. Our gold mines have as yet done little in this direction, but the tenor of Rand ore is in a downward direction, and one may still live to see the application of flotation on our lower-grade ores. In flotation may lie the salvation of our low-grade mines and incidentally the solution of our unemployment problems.

* * * *

Mr. Bleloch and the Geological Society.

Mr. W. Bleloch has written to the Geological Society as follows:—Replying to your letter of the 8th inst., after careful consideration I have decided not to give my criticism of Dr. Rogers's paper on the geology of the neighbourhood of Heidelberg to the Society. I desire to state my reasons for this decision, and I trust the council will publish this letter together with the enclosure herewith in the proceedings of the Society. (1) Dr. Rogers included insinuations and innuendoes in his paper which should not have been permitted. (2) The Council of the Society has disregarded my protest against these insinuations and innuendoes and has printed them in the Transactions. (3) The Acting President, himself a member of the Mines Department, and a colleague of Dr. Rogers, twice endeavoured to stop me when reading my reply to Dr. Rogers at the last meeting of the Society, and only allowed me to proceed after he had left the chair to consult Dr. Mellor. He eventually ruled that I must not refer to the cables regarding the Heidelberg reefs sent to London by the Rt. Hon. the Minister of Mines and Industries at the instigation of Dr. Rogers and Dr. Mellor in March last year, and he then adjourned the meeting, thus stopping further discussion and preventing the reef specimens I had brought to the meeting from being examined. (4) When Dr. Rogers's paper was read I asked that facilities should be given me to examine the map he presented with his paper. No copy of the map was supplied to me until, having found that copies of Dr. Rogers's paper with map included had been given to non-members of the Society, I asked for a copy and eventually received one from you after you had informed me that the price was 7s. 6d. I desire to protest against this, both as a member of the Society and as a member of the public; in fact as one who provides many thousands of pounds annually to the State for the Mines Department which employs Dr. Rogers and pays him for his work. (5) The Council of the Society and its Acting President have shown clearly by their actions that I have no assurance or certainty as to what might be done with my reply if once I placed it in their hands. In declining on these grounds the invitation conveyed in your letter, I will add that, being almost the oldest member of the Society, I feel regret that just such methods as I now complain of should have brought about the decline in influence and usefulness of the Society which has more than once been the subject of public comment and has marked its history from the time when it fell into the hands of partisans bent on putting down anyone who might venture to oppose their dictates and dogmas. To show that I am not alone in holding views at variance with those of Dr. Rogers and Dr. Mellor, I send you herewith a reprint of some brief statements by sixteen independent authorities.

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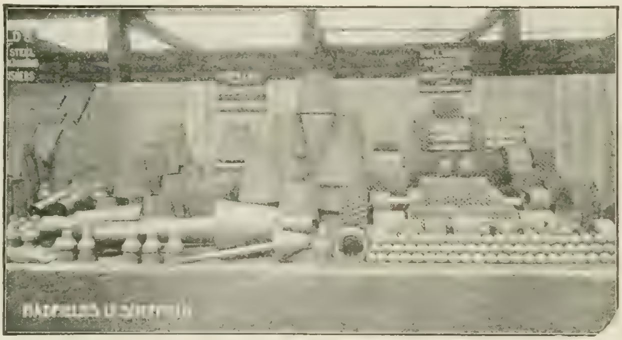

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The Effect of the War on Minerals.

We are constantly being asked by prospectors and others interested in mineral discoveries for the latest facts regarding various minerals and the effect of the cessation of the war demand on their production. The following succinct article answers many of these questions and should be retained for reference purposes.

The recent world war demonstrated the importance of national independence as regards mineral supplies for war purposes. In many countries new sources of supply were developed, some of which are likely to prove permanent, as, for example, coal in Nigeria and the Federated Malay States, manganese ore in the Gold Coast Colony, bauxite in British Guiana, Dalmatia, and Istria, and manganese in Italy. Others, however, such as the tungsten and chromium mines of the United States and some other countries, have already ceased production owing to the partial restoration of normal economic conditions.

Reduced output of many minerals, due to withdrawal of labour and limitation of markets, was a striking feature. These conditions influenced the production not only of minerals required mainly for agriculture and other peacetime industries, but also of some war minerals, notably coal and iron ore, especially in Europe. Increased oil production compensated to some extent for decline in the coal output. In the case of iron it is worthy of note that, although the output of iron ore, and consequently that of manganese ore, dropped very substantially, there was a remarkable increase in the output of nickel, chromium, vanadium, and tungsten. The latter may be aptly termed "economy" metals, for the extensive use of nickel and other alloys no doubt effected much economy of material, while the remarkable increase in tungsten output must have had a very important effect in economising labour.

Coal.

World's Output of Coal.—In 1913, 1,320,000,000 tons; in 1919, 1,130,000,000 tons.

From 1913 to 1919 there was, on the whole, a decline in the world's output of coal, more especially the European output, and costs of production increased to a greater extent in Europe than in the United States. There were signs of more normal production in 1920, the world's output for which year is estimated at 1,300 million tons.

The world's total exports in 1919 were 43 per cent. less than in 1913, due largely to heavy reduction of exports from England and Germany. The United States total exports increased from 22 million tons in 1913 to 39¼ millions in 1920, excluding bunker coal, shipments to Europe amounting to about 10¼ million tons in 1920 as compared with less than 1 million in 1913.

Petroleum.

World's Output of Petroleum.—In 1913, 55,000,000 tons; in 1920, 98,000,000 tons.

Unlike most war minerals, petroleum has continued in ever increasing demand since the Armistice. The output for 1920 was about 80 per cent. more than that for 1913, and 36 per cent. more than that for 1917. The United States output increased steadily from about 38 million tons in 1913 to 63 millions in 1920; and the output for the first quarter of 1921 was more than 1½ million tons in excess of that for the first quarter of 1920, the March output establishing a new monthly record. The Mexican output increased from 3 million tons in 1914 to nearly 23 millions in 1920, the production in the latter year being nearly double that for 1919. Outputs in Egypt and Persia increased from comparatively insignificant amounts in 1913 to nearly a quarter of a million and one million tons respectively in 1920.

This remarkable progress in oil output, taken in conjunction with the decline in the coal output, raises the question as to whether oil is not likely in the near future, to become as important as coal for power production. Oil reserves are regarded as very small in comparison with those of coal, but our knowledge of oil reserves is somewhat speculative. Moreover, the world has large oil-shale resources, and it is possible that these will be drawn upon to a large extent in the near future.

Iron Ore.

World's Output of Iron Ore.—In 1913, 175,000,000 tons; in 1917, 145,000,000 tons.

Output of iron ore fell in most of the important producing countries during the War. Comparing 1917 with 1913, the outputs of the more important countries fell by the following percentages:—United Kingdom, 7½; Newfoundland, 27; France, 90; Algeria, 27; Spain, 44; Germany, 21; Luxemburg, 42; Austria, 42; Hungary, 23; Sweden, 17; Cuba, 65. The United States' increase of 21 per cent. was exceptional. Since the Armistice output has fallen very heavily in the United Kingdom, Sweden, and some other countries. A fall of 2·3 million tons in the United Kingdom during 1919 more than offset the 1·3 million rise in 1917. The 1920 output in the United Kingdom was 12·7 million tons, compared with 12·3 millions in 1919 and 16 millions in 1913. The French output for 1920 was 13·6 million tons, as against 2 millions in 1917 and 21·6 millions in 1913. China exported 672,150 tons in 1920 as against 304,349 tons in 1917.

Manganese.

World's Output of Manganese Ore.—In 1913, 2,272,000 tons; in 1917, 1,864,00 tons.

Output of manganese ore varies in very close sympathy with that of iron ore. The output of manganese ore for the five years 1913 to 1917 inclusive averaged about 1·3 per cent. of the iron ore output, and it is noteworthy that this average was maintained in spite of the fact that Russian exports were cut off by the War.

Nickel.

World's Output of Metallic Nickel.—In 1913, 32,000 tons; in 1918, 47,500 tons.

During the War Canada increased her proportion of the world's output from nearly 70 per cent. in 1913 to nearly 90 per cent. in 1918, and large nickel refineries were established in the Dominion. The entire output of matte had previously been exported. Excessive production for war purposes resulted in heavy stocks after the Armistice, and consequently in reduced output for 1919 and 1920. Until stocks are cleared, output is likely to be comparatively small.

Chromite.

World's Output of Chromite.—In 1913, 116,000 tons; in 1918, 270,000 tons.

The increased war demand for chromite was met largely by the United States, where the output increased from 255 tons in 1913 to 82,550 in 1918, but fell to 3,900 in 1919, and practically ceased in 1920. Pre-War conditions as regards chromite are being rapidly restored, with Rhodesia and New Caledonia as the leading producers.

Tungsten.

World's Output of Tungsten Concentrates.—In 1913, 8,000 tons; in 1918, 34,000 tons.

The importance of ferro-tungsten in the manufacture of high-speed tool steels compelled the United Kingdom, previously dependent on Germany for supplies of tungsten (manufactured largely from Burmese wolfram), quickly to adapt herself to the War situation, and to manufacture all the tungsten and ferro-tungsten she required. Among other countries contributing to the world's increased production, the United States and China were conspicuous, the former increasing its output from 1,372 tons in 1913 to 5,486 tons in 1917, although producing only 295 tons in 1919. China produced 9,375 tons in 1918, as against 20 tons in 1914. Tungsten mining in the United States ceased during 1920, and is unlikely to compete in the near future with China.

Vanadium.

World's Output of Metallic Vanadium.—In 1913, 400 tons; in 1917, 1,200 tons.

Increased supplies of vanadium during the War were obtained chiefly from the patronite deposits in Peru. The demand continued brisk until towards the end of 1920, but then abated, and the Vanadium Corporation of America closed its Colorado works, finding that the world's demand could be fully and most economically met by the Peruvian deposits.

Magnesite.

World's Output of Crude Magnesite.—In 1913, 595,000 tons; in 1917, 668,000 tons.

An immediate effect of the War was to stop shipments to Allied countries of sintered magnesia from Austria-Hungary, which had previously supplied the greater part of the world's requirements of refractory magnesia. British and French needs were met by the Grecian output, which had been in less demand for refractories before the War.

Graphite.

World's Production of Graphite.—In 1913, 134,000 tons; in 1917, 213,000 tons.

During the War there was an increased demand for graphite for crucibles, foundry uses and lubricants, and the world's output in 1917 was nearly 60 per cent. higher than in 1913. Of the countries participating in the increase the most conspicuous were Germany, increasing her output of about 12,000 tons in 1913 to about 64,000 tons in 1918, and Madagascar, increasing from about 8,000 tons in 1913 to 35,000 tons in 1917. Ceylon, formerly the chief source of graphite, has suffered through production in Madagascar, though even the Madagascar output has dropped heavily since the Armistice.

The World's Coal Industry in 1920.

An interesting report has been issued by the United States Geological Survey giving a review of the world's coal industry during the year 1920. It points out that the prices reached were the highest of modern times, and, as usually happens at such a time, the quality of the output deteriorated. In the last two years of the War the world's output had risen close to the pre-War level. After the Armistice, however, the cessation of munitions manufacture and the delay in resumption of normal business curtailed the demand for coal. Industrial disputes, both in Europe and America, closed many mines late in 1919 and further reduced the supply. Thus, when in 1920 the world set his face to work again and industrial activity was resumed where resumption was possible, consumers' reserves of fuel proved insufficient, and an almost universal feeling of apprehension over the coal supply swept around the world. The reasons for this alarm—lately a thing of the past—became clear when the world's production in 1920 is cast up.

The World's Production of Coal, 1910-1920.

Year.	Production (in part estimated) Met. tons.	Per cent. produced by U.S.
1910	1,160,000,000	39.2
1911	1,189,000,000	37.9
1912	1,249,000,000	38.8
1913	1,342,000,000	38.5
1914	1,205,000,000	38.6
1915	1,196,000,000	40.4
1916	1,296,000,000	41.4
1917	1,345,000,000	44.0
1918	1,331,000,000	46.2
1919	1,158,000,000	42.9
1920	1,300,000,000	45.1

The fluctuations in world coal supply become somewhat clearer if expressed as index figures, taking the output in the year 1913 as equal to 100. The production in the other years then becomes as follows:—

1910	86	1916	97
1911	89	1917	100
1912	93	1918	99
1913	100	1919	86
1914	90	1920	97
1915	89		

These figures are necessarily in part estimated, for official statistics are slow in coming in, but the margin of error in the total probably does not exceed 1 or 2 per cent.

In comparing the 1920 output with that of the year before the War it must be remembered that the world's consumption normally increases by leaps and bounds. The average yearly rate of increase in the twenty-year period preceding August, 1914, was 38,000,000 tons.

The decrease in output centring in Europe may be likened to a condition of vacuum. The stimulus of demand was felt not only in neutral countries of Europe—Spain and Holland—which developed their scanty resources to the utmost, but extended to the Americas, Africa and Asia. Japanese, Chinese and East Indian mines took over the bunkering business relinquished by the British in the Far East. In the bitterness of Europe's need American coal was shipped through Trieste and Fiume to Austria, or carried up the Rhine to Switzerland, passing within gunshot of the great Ruhr field of Germany. Considerable tonnages were brought from South Africa. Even the East Indies and far-away Spitzbergen felt the stimulus.

The manner in which the outlying countries came to the assistance of Europe is shown in the following table, which gives production, by continents, before and after the War:—

Production of Coal, by Continents, 1913 and 1920.

Continent.	1913.	1920.	Per cent. of change.
North America ...	531,600,000	601,300,000	+13.1
South America...	1,600,000	1,700,000	+ 6.2
Europe	730,000,000	597,500,000	−18.1
Asia	55,800,000	75,800.000	+35.9
Africa...	8,300,000	11,800,000	+42.2
Oceania	15,000,000	11,900,000	−20.7
World	1,342,300,000	1,300,000,000	− 3.2

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MANAGERS' CERTIFICATES.—Our record is 100% passes. 1912-20 *we claimed* 165 *certificates*; 40 *in* 1919-20; *last* 3 *Exams.*, 29 *certificates* (*total*). 10 *Coal Certificates in last* 3 *Exams.*

TUITION (Metal or Coal) by class, correspondence or privately.

The above passes are based on official returns; any claims based on number of entries are obviously unreliable.

Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St.

The Week in the Sharemarket.

BETTER NEWS FROM LONDON LEADS TO GENERAL IMPROVEMENT—THE GOLD PREMIUM TO BE STABILIZED?—EX-ENEMY SHARE SETTLEMENT.

The firm undertone of last week developed into a better and more active market during the current week, with prospects of continued improvement. Quotations all firmed up on Wednesday, the reason being given as the better news from London, which is said to be again buying South African shares. It is said that the gold premium is to be stabilised, and there seems to be reason to believe that the ex-enemy share business may soon be finally settled. Sir Lionel Phillips and General Smuts may have had time to discuss this matter on the voyage, and it is hoped that a statement may be forthcoming on the Prime Minister's return. A slight labour trouble at the Modder B and the failure of the railway people to come to an agreement were not allowed to check the improvement, and the market remains in a cheerful mood. At the General Mining meeting the Acting Chairman reviewed the year in detail, and his remarks are discussed in another part of this issue. The rise in quotations is reflected in the following table:—

	Fri 19th.	Sat. 20th.	Mon. 22nd.	Tues. 23rd.	Wed. 24th.	Thur. 25th.
Anglo-Amer. Corp.	24 0*	24 3*	24 3	25 0	26 3	25 9
Apex Mines	7 0*	7 0*		7 4½	7 3*	8 0†
Bantjes Cons.	5 9*	—	5 4*	5 9	6 0	5 9*
Brakpan Mines	51 9*	—	52 0*	52 6*	52 6*	53 6*
City and Sub.	—	—	2 3*	2 6	2 9*	2 4*
City Deeps.	48 6*	48 9*	48 9	49 0	51 0	51 0*
Clydesdale Colls.	—	28 6*	26 0*	26 0*	26 0*	27 6
Con. Diamonds	18 4½	18 9	18 6	18 7½	19 4½	18 9
Con. Main Reefs	10 3*	10 6	10 9*	11 0	11 3*	11 0*
Con. Mines Selects.	15 6	—	15 0*	16 0*	19 0	—
Coronation Colls.	40 0*	—	40 0*	40 0*	—	40 0*
Do. Freeholds	1 0	0 10*	0 10*	0 10*	0 10*	1 0
Do. Syndicates.	6 3*	6 0*	6 3	5 6*	—	5 9*
Crown Dias.	4 0*	4 0	3 11	3 9*	4 0*	3 9*
Crown Mines	40 0*	42 0*	42 0*	44 0*	46 6	—
Daggafont Mines	3 0*	3 0*	3 0*	3 2	3 0*	3 1*
East Rand Coals	2 2*	2 2*	2 3†	2 2*	2 2*	2 0*
Do. Deeps	0 7*	0 7*	0 7*	0 7*	0 7*	0 7*
E.R. Minings	—	—	—	9 0*	—	—
E.R. Props.	—	5 9	5 6*	6 0*	6 4*	6 6*
Frank Smith Dias.	4 5	4 3*	4 4	4 3	4 3	4 2
Geduld Props.	48 6*	48 6	48 9	48 9*	50 6	50 9
Glencoe Colls.	14 6†	—	—	14 6†	13 6*	—
Glynn's Lyden.	5 6*	—	—	5 6*	—	7 0*
Government Areas	82 6*	82 6*	82 0*	83 0	85 3	84 3*
Hume Pipes	14 0*	17 0†	17 0†	16 0†	14 9	15 3
Knight Cents.	4 4*	4 4*	4 4*	4 5	4 8	4 7
Knight Deeps	—	—	—	—	3 9*	3 9*
Lace Props.	7 0*	7 6	7 6*	7 6*	8 0*	8 3*
Leeuwpoort Tins	9 9*	9 10*	9 10*	9 10½	9 10*	10 0*
Luipaardsvlei Est.	2 0*	2 0*	2 0*		2 0*	2 0*
Lydenburg Farms	5 6*	5 6*	5 6*	5 9*	5 10*	6 0*
Middelvlei Est.	—	—	—	1 3*	1 3*	1 3*
Modder B.'s	28 0	28 7½	28 9	28 9*	30 3	31 0
Modder Deep	44 3	44 3	44 0*	44 3	45 6	45 0
Modder Easts	9 7	9 10½	9 10½	10 3*	11 6	10 10½
Natal Nav. Colls.	33 6†	33 6†	33 3	33 6†	32 9*	32 3
National Banks	£11*	£11*	£11*	£11*	£11*	£11*
New States	25 3	25 3*	25 6*	25 6	26 0	25 6
New Eland Dias.	—	22 0*	22 6a	24 6	24 0*	25 0*
New Era Cons.	7 4*	7 6	7 6	7 6	7 9	7 6
New Geduld Deep	1 4*	1 4*	—	1 4*	1 4*	1 4*
New Kleinfonteins	—	5 10*	6 0*	—	5 9*	5 10*
New Modderfonteins	71 6*	74 0*	71 9*	72 6*	75 9	76 0
New Unifieds	—	4 0†	—	—	—	4 0†
Nigels	4 3*	5 3*	5 6*	6 0*	—	6 0*
Nourse Mines	8 6*	9 3	10 3	10 6	10 3	10 3*
Premier	—	—	90 0*	—	95 0*	—
Pretoria Cement	48 0*	48 3*	48 3*	48 3*	48 0*	48 0*
Princess Estates	0 11*	1 0	1 0*	1 0*	1 0*	1 1
Rand Collieries	0 10*	0 10*	0 10*	—	—	—
Rand Nucleus	1 0*	1 1*	1 1*	1 1*	1 2*	1 2*
Rand. Select Corp.	51 3*	52 6*	—	—	—	56 3*
Randfont. Cent..	11 6†	10 0*	10 9*	11 6	11 6	11 6*
Randfont. Est.	17 0	16 10½	16 10½	16 9	17 6	18 1½
Roberts Victors	9 0*	9 0	—	9 6†	9 0*	9 0*
Rooibergs	4 0*	—	—	4 0*	4 0*	3 9*
Rouxville	1 10*	1 10*	1 10*	1 9*	1 11	1 10
S.A. Alkali	18 6	17 6	17 0	17 0*	17 0*	17 3
S.A. Township	10 9*	—	11 0	11 0*	11 0*	11 0*
S. Van Ryn	2 10*	—	2 9*	2 9*	2 10*	2 10*
S.A. Breweries	—	—	27 0*	—	27 0*	28 0*
S.A. Lands	4 3*	4 4*	4 6	4 6*	4 10	4 9
Springs Mines	43 6	44 0*	43 0*	43 6	45 9	45 6*
Sub Nigels.	11 0*	11 0*	11 6†	11 3	11 6*	11 3*
Swaziland Tins	10 0†	10 0*	—	10 0†	—	10 0†
Trans. Silver	22 6	22 0*	22 0*	25 0*	23 0*	24 6
Tudors		0 5*	0 6*	0 6*	—	—
Trans. G.M. Est.	—	8 9*	8 9*	8 9*	—	8 6*
Van Ryn Deeps	72 6	72 0*	72 0*	73 0*	74 9*	76 6
Village Deeps		—	9 0*	8 9*	9 3*	10 0
Van Dyks	—	1 0*	1 0*	1 0*	1 0*	1 0*
West Springs	12 6	12 9*	13 3	13 9	14 3*	14 6
West Rand Cons.	2 6†	2 6*	2 1	2 0†	2 0†	2 6†
W. Rand Ests.	4 0*	4 0*		4 3		4 0*
Witbank Colls.	42 6*	—	44 0	43 0*	44 3*	43 6*
Witwatersrands	—	12 6*	—	12 6*	—	—
Witwatersrand Deeps	8 0†	7 0*	7 0*	7 0*	8 0†	7 4*
Wolhuters	4 0†	3 10	3 9*	3 10*	4 3	4 1*
Zaaiplaats Tin	3 7*	3 6*	3 7½	3 6*	3 3	3 0*

Letters to the Editor.

EMERALD & VICTORY DIAMONDS.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir.—In your last issue we notice a letter by Mr. Hodgkins asking for information with reference to the Emerald and Victory Diamonds, Ltd. Surely Mr. Hodgkins knows that secretaries of companies are not responsible for the company's policy, and that they cannot issue statements without the sanction of their directors. If Mr. Hodgkins will make inquiry of the chairman of the companies concerned, we will see that his letter is forwarded in due course.

Yours faithfully,

L. CHARLSTON GOCH & CO.

THE TRAGEDY OF THE HEIDELBERG AREAS.

To the Editor, *S.A. Mining and Engineering Journal.*

Dear Sir,—I think it would be as well to make a correction in your next issue on the above article. On page 611, under the heading *Milling under Difficulties*, it reads: "By the end of the month (June) I had accumulated 82 ounces of gold from 190 tons crushed." Copy of my article reads: "By the end of the month (June) I had accumulated 82 ounces of amalgam, which retorted 21 ounces of gold from 190 tons crushed."—Yours faithfully,

G. A. ROBERTSON,

Box 963, Johannesburg.

Mr. G. T. Milne, British Trade Commissioner on the Headquarters Staff of the Department of Overseas Trade, London, who has been visiting the Union during the absence on official business of Mr. W. G. Wickham, Senior British Trade Commissioner in South Africa, is returning to London per s.s. *Kinfauns Castle.* Mr. Milne, who has been re-appointed to his former post of Senior British Trade Commissioner in Canada and Newfoundland, will take up his duties in Montreal in October.

Chairmen of the Johannesburg Stock Exchange.

We are indebted to the Secretary of the Johannesburg Stock Exchange for the following interesting list of Chairmen of the Johannesburg Stock Exchange since 1888:—

B. M. Woollan, 1888; Jas. Hay, 1889, 1890, 1891, 1892, 1893; H. Solomon, 1894, 1897, 1898, 1903, 1905; M. Dold, 1895; S. B. Joel, 1896; A. M. Niven, 1899; E. E. Berlandina, 1902; J. W. Philip, 1904; A. Sprinz, 1906; John Roy, 1906; S. Thomson, 1907; W. I. Haley, 1908; E. Friedlander, 1909; R. A. Bettington, 1910; D. C. Greig, 1911, 1912, 1914, 1915, 1916, 1917, 1918, 1919; J. E. Jones, 1913; J. H. L. Manisty, 1919, 1920; R. T. Mathison, 1921.

ENGINEERING SECTION.

The Evolution of the Steel Industry.

By J. Bethell, of Messrs. Spear & Jackson, Ltd., Etna Works, Sheffield.

This being the first of a series of articles on steel, I feel that to commence from the first discovery of iron, its use in the iron age and so on is absolutely unnecessary, but what is of real interest is the evolution of the modern methods of steel production and the exact dates of the successful application of these methods. The first step in the production of high quality steels was made by Reaumur in 1720, making crucible steel on an experimental scale, for the first time known in history. Although quite ignorant of Reaumur's researches, Huntsman, a watchmaker, who was having exceptional difficulty with the steel from which he was making his watch springs, successfully produced crucible steel on a commercial basis in 1740. It is, of course, a well-known fact that Shear steel, used for knives, etc., was made years before 1740, but although it was a remarkably pure product its uses were very limited. In 1852 Henry Bessemer commenced his experiments on the manufacture of steel, and in 1855 was granted patents for his process. Owing to difficulties (with which I will deal in a later article), this process was not an immediate success, and in 1858, R. Mushet, one of the foremost metallurgists of this period. suggested the solution to these difficulties. and in 1860 works were erected in Sheffield and the furnaces put into operation. We now come to the Siemens-Martin, or as it is very often termed, open-hearth process. M. Martin's first experimental furnace was at Sireuil, and the first plant producing this class of steel in England was at Crewe, in 1868. This is, therefore, the third modern method of steel making which has proved successful, and although there have been a number of modifications of this process, to mention a few, The Wellman Tilting Furnace, Talbot, Bertrand-Thiel, and Monell, they are essentially open-hearth and do not constitute new processes. The electric steel making process was commenced as far as the experimental stage was concerned about 25 years ago. This process soon proved a success, and is now producing very high quality steels. To mention a few of the successful furnaces, we have the Heroult, Girod, Electro-Metals, Greaves-Etchells, Stobie and others. It can, therefore, be definitely understood that the following methods of steel manufacture are the outstanding methods of the present-day industry:—Crucible; Bessemer, acid and basic; Siemens-Martin, acid and basic; Electric. As a general idea I will give you the purposes of the steel made from these different processes and also an outline of the reasons for the using of these steels in their different spheres in engineering, construction, and other spheres.

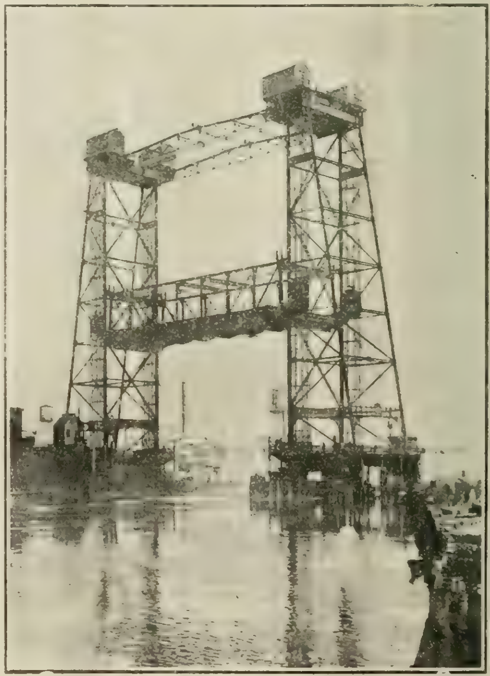
Crucible Steel.

This is essentially a tool steel, that is, a steel which has to take a good cutting edge and also of high quality to work other classes of steel in the lathe and other machines. Owing to the facts, that (1) very small quantities can only be made at a time, maximum 56 lbs. per crucible (2) high quality of irons must be used; (3) present high cost of good coke; this steel is expensive, and if No. 2 is sacrificed by using cheap scrap or second quality irons, the final product is decidedly inferior and not worthy of the name of crucible steel. Tungsten steels (high speed) are made by this process, and up to a short time ago was the only method known, although it is a recognised fact that it is very difficult to melt tungsten and other refractory alloys properly in the crucible.

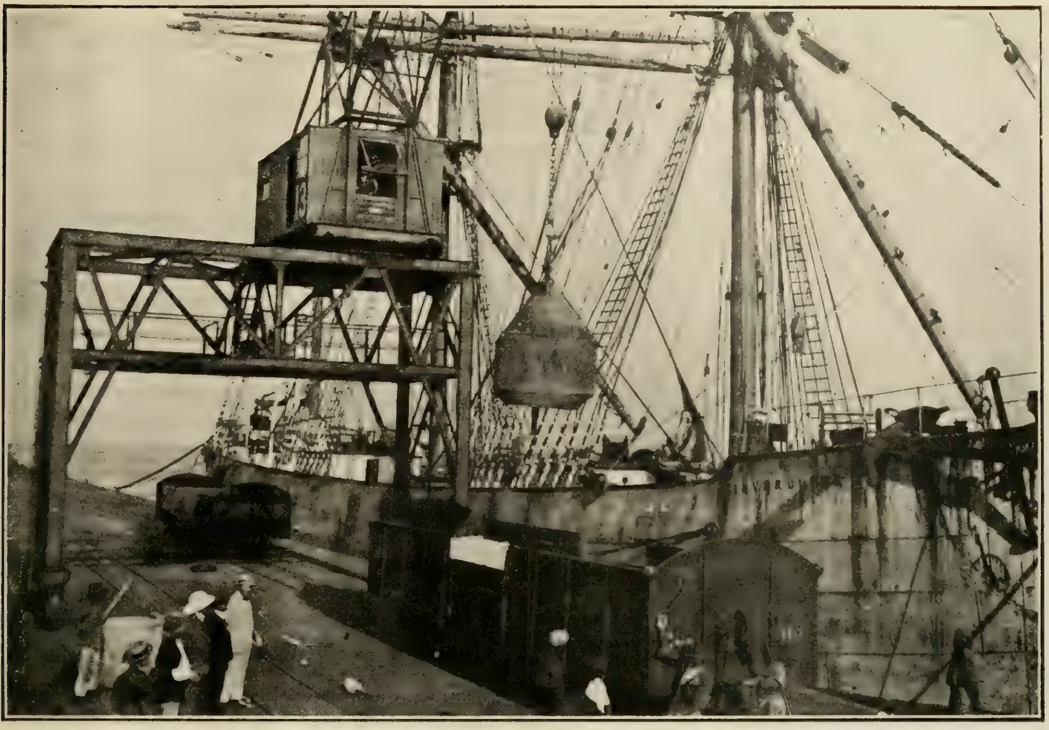
Bessemer Steel.

This is the cheapest type of steel, and is chiefly used for railway material, rails, etc. Not being of sufficiently good quality to keep a good edge, it is not used for tools, etc.

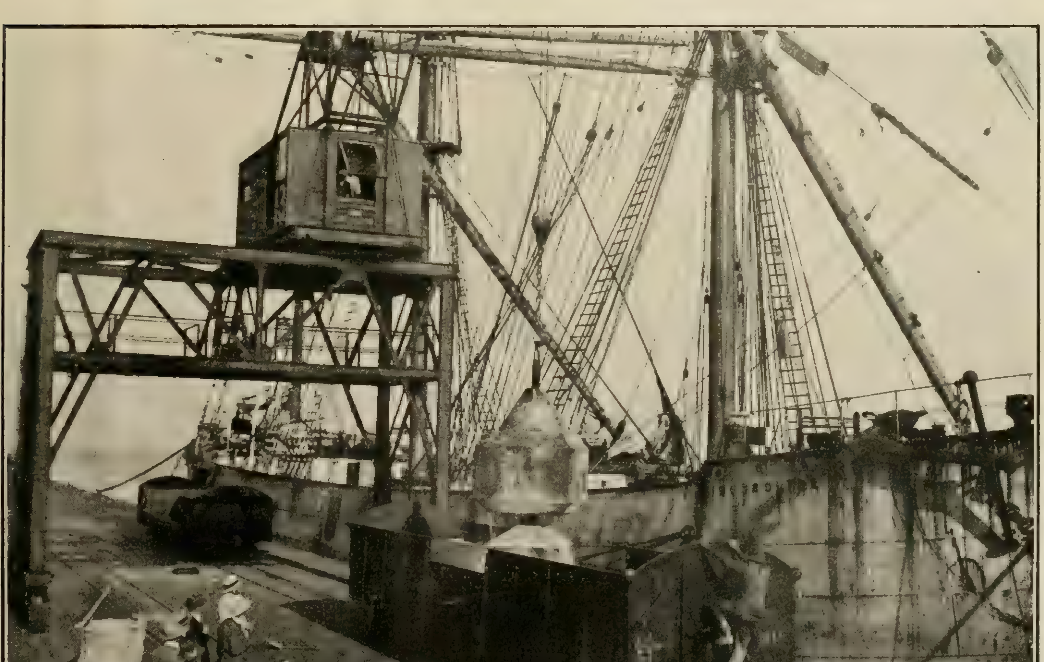
A BRIDGE THAT OPERATES LIKE AN ELEVATOR.



Spanning the Chicago River is a bridge which is considered one of the most remarkable engineering feats in the world. In the manner of its operation it is similar to a gigantic lift. The movable span, which weighs 280 tons, is counterweighted at each corner with cast iron counter weights weighing 70 tons each. The movable span itself is 130 feet long and 61 feet wide, and when raised gives a clearance of 150 feet from the water's edge. The bridge is worked by two electric motors of 65 horse-power each.



Port of Lourenco Marques, Delagoa Bay. Provay's Patent Automatic Bucket discharging Sulphur from the Sailing Vessel, "Inverclyde," July, 1921. Loaded Automatic Bucket leaving Ship's Hold.



Port of Lourenco Marques, Delagoa Bay. Provay's Patent Automatic Bucket discharging Sulphur from the Sailing Vessel, "Inverclyde," July, 1921. Bucket automatically discharging after having come to rest on Truck.

Swedish Bessemer is used for the cheaper tools in some instances, but, generally speaking, the Bessemer process is not suitable for tool steel making. It is undoubtedly the least uniform and reliable process that we have to-day, and contains comparatively large quantities of occluded gases, a deadly enemy of the steel manufacturer. Its cheapness is due to the fact that it is made in very large quantities and is a very quick method.

Siemens-Martin (Open Hearth).

Used for railway and constructional steels, also common tools. This process has practically superseded the Bessemer for constructional steels, and is superior as regards occluded gas, uniformity, reliability, etc. Steel made by this process will hold a fair edge as a tool, and as it is decidedly cheaper than either the crucible or the electric process, in some cases is used as a tool steel. The quality, of course, is inferior, but as you will readily see, there are times when price is the first consideration, and when three or four tools can be bought instead of one, a saving may be made in the long run. The practice of calling this quality of steel a " tool steel " is absolutely wrong, although it is very often done. Motor car steels and alloy steels for general uses are made by this process, excepting, of course, tungsten steels, which require a very high heat.

Electric Steel.

As this is the most recent method of steel making, we naturally look for the advantages of this over other methods, and we do not look in vain. As regards purity, this process is the first in the world, for we have a steel most free from occluded gas, and the lowest sulphur and phosphorus contents. Whereas in the Siemens, Bessemer and crucible our product is limited, that is to say, each process is unable to make certain classes of steel, the electric process has no limitations whatever, and any analysis you may require can be obtained. We therefore produce high quality tool steels, high speed steels, automobile high tensile steels alloy steels of very high percentages of alloy, iron, of highest known commercial purity. I will deal with each process in detail in future articles, also heat treatment of steels, mechanical testing of steel, special steels, the care of tools, and pyrometry if I find the latter of sufficient interest to warrant such an article. Needless to say, I will endeavour to deal with each subject in a simple form, and should I find it absolutely essential to use technical terms I will explain them. Also, I shall only be too pleased to discuss any points which may be of a special interest and which are not of sufficient general interest for an article.

A Provay Patent.

We published in our issue of two weeks ago on page 1670 under the heading " Another Provay Patent," a short notice referring to a practical demonstration which was given at Delagoa Bay of an automatic bottom discharge 8-ton bucket, the invention of Mr. G. Provay. Due to an error, the capacity was printed by us and other papers as eight tons; the skip actually tested is of only two-ton capacity, and we are able to publish to-day an interesting photo showing this automatic skip discharging sulphur from the sailing vessel *Inverclyde* at Delagoa Bay last month. Of course, the bucket can be built on the same principle practically for any capacity and of any shape, and also for all kinds of material to be handled in bulk. As a matter of fact, one of these patent buckets, but of eight-ton capacity, is being built at present in Johannesburg for Messrs. Head, Wrightson and Co. (S.A.), Ltd., the contractors for the new coaling plant at Delagoa Bay. This bucket is intended to work in conjunction with the existing ten-ton electric travelling wharf crane at that port, and will be filled from the two coal towers which are to be erected on the site.

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Electrification of American Mines.

A report of the Mine Equipment Committee of the American Institute of Mining and Metallurgical Engineers and the Mines Committee of the American Institute of Electrical Engineers has been published. The report states that until recently the coal mines of the United States have been particularly active and the price of coal has been such that most mining companies have had a fairly profitable season. This has enabled a great many mines to establish improvements in the way of electrifications that they had been looking forward to for some time. In many cases the central stations have found it necessary to refuse coal mining loads on account of having no surplus capacity. In the large majority of cases it is not difficult to show coal mining companies that they can operate their mines more economically from purchased power than from their own power plant. Isolated power plants are being installed in some cases where central station power is not available, and also where the operator feels that central station power is not as reliable as his own plant would be. This is particularly true where the coal mining plant is throwing away fairly high-grade waste coal, and where a stand-by steam plant is kept in operation to take care of operating the auxiliary hoist and fan in the case of power failure. The tendency in isolated plants is to instal geared turbines up to a capacity of 500 kw., and above this capacity the direct connected alternating current turbine.

The rotary converter is becoming more popular each year for mine service. The most important development during the last year has been that of the automatic sub-station for mine service. One of these plants has been in successful operation for several months, and several more are being built. It is felt that, in the future, the automatic sub-station will play a very prominent part in mine installations. The electric hoist is rapidly replacing the steam hoist to such an extent that a steam hoist is rarely installed in a new mine. The large majority of hoists for coal mines are of the alternating current type, using a wound rotor induction motor with the magnetic type of control. Recent improvements in the control and safety devices make the electric hoist practically foolproof, and serious accidents are of very rare occurrence. A few installations have been made using the Ward-Leonard system of control and flywheel motor generator set. The Ward-Leonard control is necessary where very fast hoisting cycles are required, and the flywheel is necessary where the customer is penalised for momentary peaks.

The past year has seen a continuation of the development and application of magnetic control to mine locomotives. The demand for the individual capacity of mine locomotives has been increasing, until it becomes very difficult to supply a drum-type controller for 250-volt service. The magnetic type of control is a satisfactory solution for this problem, and a number of such locomotives have been recently installed. The large unwieldy drum controller is replaced by a small master controller, which takes away a considerable element of danger from the motorman's position. The main controller, consisting of magnetic contractors and reverses, can be distributed back in the locomotive, preferably suspended from the underside of hinged covers, which enables the equipment to be readily inspected and repaired. The use of magnetic control has greatly simplified tandem operation. With drum-type controllers, it is necessary to mount a large four-motor controller on the primary unit, a two-motor controller on the secondary unit, and the two units connected together by a large number of heavy power cables, when tandem operation is required. With magnetic control, the two units are identical, and the only connection between the units required is one power cable and a control cable consisting of nine control wires. The advent of magnetic control makes it necessary for the mining companies utilising it to furnish better voltage regulation for the mining circuits, which in turn will save considerable power loss, and also keep down repairs on mining equipment, which repairs in the past have been largely due to poor voltage regulation.

A number of improvements and new features have been added to the construction of mine locomotives during the past year. Of these, the most important are the substitution of the leaf-type spring for the helical type of spring, the installation of the end thrust type journal box, the use of equalisers on two-axle locomotives, the application of detachable rims to locomotive wheels, and the more general application of dynamic braking on mine locomotives. The value of these various improvements can only be determined after a thorough trying out.

In metal mines, electric power is gradually replacing steam on shovels and drag lines where electric power is available. There are at present two systems being used; one the alternating current, in which wound rotor induction motors are used to operate the various parts of the shovels and drag- lines; the other, to use direct-current mill-type motors receiving power from a synchronous motor generator set. The motors are operated by rheostatic control. A recent development is being watched closely by all engineers interested in the handling of shovels and drag lines. This consists of direct-current motors on the shovels receiving power from the synchronous motor generator set, with a separate generator for each motor. Ward-Leonard control is used, and the advantage of the system claimed is that all rheostatic losses are eliminated and the momentary peaks are kept off the power system. It is hoped that during the next few months sufficient data will be obtained to determine the feasibility of this system and its economy when compared with the other two systems.

During the past year some very important installations of car dumpers have been made at the Atlantic ports. These car dumpers are increasing in size from year to year, and there has recently been placed in operation at Baltimore the largest car dumper yet constructed. This requires four of the largest mill type direct-current motors built on the cradle hoist, all operated from one master controller. It is felt that if these car dumpers increase further in size, it will be necessary to utilise the Ward-Leonard control system.

There has been little change in the type of equipment for ore bridges during the past year, but the largest coal bridge ever built has been installed and placed in operation by the American Bridge Co. at the by-product coke plant of the United States Steel Corporation at Clairton, Pennsylvania. This bridge is expected to take care of a large tonnage of coal from barges in the river to storage piles, in order to ensure a steady supply of coal to the coke ovens at Clairton, the largest by-product coke oven plant in the world.

During the past year an advance has been made in the design of locomotives for quenching service in and about by-product coke ovens. The latest type of locomotive is equipped with electro-pneumatic control, having not only automatic acceleration, but also the ability to operate on any notch. These locomotives weigh about 25 tons each, and have a number of new features in regard to mechanical arrangement of parts that are quite an improvement over the past type of construction for quenching locomotives.

The coke loading locomotives at the Clairton plant are of the combination type, using remote control while the coke train is being loaded. These locomotives have been operating very successfully during their second year, and have effected a large saving over the older scheme of using steam locomotives or the cable haul. It is felt that in the future there will be a considerable call for the remote control of locomotives and cars, wherever large amounts of material are to be handled over fairly great distances.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS QUIET BUT OUTLOOK HOPEFUL—NEW MATERIAL PRICES LIKELY TO REPLACE SECOND-HAND SHORTLY—EARLY SATISFACTORY SETTLEMENT IN BUILDING DISPUTE ANTICIPATED—IRON AND STEEL—BUILDING AND TIMBER MATERIALS—ELECTRICAL GOODS—OIL—BRITISH TRADE OUTLOOK—LOCAL INDUSTRIALISM—CONDITIONS IN GERMANY—SHIPPING CONDITIONS.

General Position.

Trading this week has been exceedingly quiet and the volume of business put through very small. Although there are no special reductions in prices to report at the moment, merchants are coming into a more satisfactory position, owing to their getting in lower-priced material, in which they can give much lower quotations than has hitherto been possible. The lower level thus made possible makes a very considerable difference in some lines, especially in the heavies. These new prices will shortly make themselves appreciably felt and affect to a great extent the market for second-hand goods, which has for some considerable time dominated the position. The prices for new material are, it is said, within reasonable distance of those which have been ruling for second-hand for some time past, and which will necessitate a drastic drop in the latter at an early date, as, of course, the demand for second-hand material is bound to cease when buyers can secure new at levels not much below the former. Merchants, despite the present dullness and the general tendency of prices to decline, are hopeful, and think the outlook within a period that may be reckoned by months promising. The old stocks at high prices are gradually being depleted, and the time must come when, these having been disposed of, new stocks at lower levels can be bought, when normal profits will again rule. The mining community, although realising the gravity of the present deadlock in the matter of the building trade dispute regarding wages, is practically unanimous that the trouble will be amicably settled before the 16th September in a give-and-take manner. This is not the time for going to extremes, and it is confidently anticipated that a golden bridge will be found to solve the difficulty between masters and employees. There is a lot of building work to be done; architects' hands are over-full with orders and plans, and a satisfactory settlement of the trouble should soon see a very increased scale of activity in building operations, because the public, now of course hanging back, once they see no further reductions can be expected—and there can be no doubt that the cost of materials is for the time being at bed rock (in many cases much below replacement values)—will naturally wish to go on with their plans. Buildings of various kinds are urgently needed at the moment and only awaiting a decision regarding wages before being taken in hand vigorously.

Iron and Steel.

Business this week has again been of a very quiet character; the Commercial Exchange has been practically lifeless, with, however, continued cutting of prices.

Latest quotations:—Dunswart, 29s.; Union Steel Corp., Ltd., ordinary sized rounds, flats and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 45s.; ⅜ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron, 37s. 6d.; steel, 39s. 6d.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 45s. to 57s. 6d.; ¼ in. square iron, 55s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 52s. 6d. to 59s.; channels and joists, 47s. to 48s.; shafting, ⅝ in., 10¼d.; ¾ in., 10d.; 1 in., 8d. to 9d.; 1¼ in. to 2 in., 7d. to 8d.; larger sizes, 8d.; steel plates, 1-16 in., 33s. 6d.; ⅛ in., 33s.; 3-16 in., 33s.; ¼ in., 31s. and upwards; all 100 lbs., 31s.; spring steel flats, 8½d. to 9d. per lb.; bolts and nuts, ⅜ in., 1s. to 1s. 2d. per lb.; ½ in., 65s. per 100 lbs.; ⅝ in., 62s. 6d.; ¾ in., 60s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in. and ¼ in., 8½d.; ½ in., 6½d.; ⅝ in., 6d.; ¾ in., 6d. per lb.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 50s.; ⅝ in., 50s. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 7d.; ½ in., 1s. 5d.; ⅝ in. and upwards, 1s. 4d.; brass sheets, 2s. 2d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 2d. to 2s. 4d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7d.; hollow, 9d. to 1s.; wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 57s. 6d. to 60s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Iowa," 66 lbs. 14 gauge, 20s. per coil; "Iowa," 98 lbs. 12 gauge, 24s. 6d. per coil; "Shorthorn," 69 lbs. 13½ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge 100 lb. coils, 25s. per coil; No. 10 gauge, 100 lb. coils, 27s. 6d. per coil; No. 12 gauge, 100 lb. coils, 30s. per coil; Bulb Tee fencing standards, 14 lb., 27s. 6d. per doz.; 12 lb., 24s. per doz.; black baling wire, 14 gauge, 20s. per coil 100 lbs.; screening, 3s. to 9s. 6d. per square yard; copper tubes, solid drawn, ¼ in., 3s. 9d. per lb.; ⅜ in., 2s. 11d. per lb.; 7-16 in., ½ in. and 9-16 in., 2s. 9d. per lb.; ¾ to 1⅛ in., 2s. 6d. per lb.; 1½ in. to 2 in., 2s. 3d. per lb.; 2½ in. to 3 in., 2s. 6d. per lb.; 3½ in. to 4½ in., 2s. 8d. per lb.; copper rods, ⅜ in., 2s. 5d. per lb.; ½ in., 2s. 4d. per lb.; ⅝ in. to 2½ in., 2s. 2d. per lb.; cyanide for outside mines, 1s. 6d. to 1s. 7d.; zinc shavings, about 1s. per lb.

Bethlehem Steel Corporation, it is reported from New York, on the announcement of lower prices, slumped by three points. The company recently announced a 15 per cent. reduction in wages. The new price schedule shows the following changes: Bars from dollars 2.10 to 1.90; structural shapes, from 2.20 to 2.00; plates from 2.20 to 2.00; sheet bar, from 39 to 35; billets, 4 x 4, from 37 to 33; slabs, from 38 to 34; blue annealed sheets, from 2.85 to 2.65; black sheets, from 5.75 to 5.50; galvanised sheets, from 4.75 to 4.50; tinplate, from 6.25 to 5.75; skelp, from 2.20 to 2.00. The new prices represent a reduction of 4 dollars a ton on bars, structural shapes, plates, skelp, billets, sheet bar, slabs and blue annealed sheets; 5 dollars a ton on black and galvanised sheets; 10 dollars per ton on tinplate. The President of the Bethlehem Steel Company in announcing these reductions said that present manufacturing costs did not in any sense warrant them, but the company desired to contribute even more than its full share to re-establish conditions in the steel trade on what might be regarded as a normal basis.

Newcastle Iron and Steel Works' Increased Capital.

The Newcastle Iron and Steel Works, at a meeting of shareholders last Monday, authorised the increase of the capital to £200,000 and the issue of 2,000 debentures of £25 each, bearing interest at 9 per cent., convertible within two years into £1 shares at debenture holders' option. The debentures are to be issued for a period of ten years, with the option to the company to pay them within five years.

Engineering Shops.

Business appears to be on the mend during the past week or ten days, more orders having been received than for some considerable time. Mr. Waldie Peirson, K.C., chairman of the S.A. National Union, at the recent meeting of that body said he felt sure it would be to the interest of the engineering shops on the Witwatersrand, many of which he understood were well equipped with modern plants, to let it be more generally known what different classes of work they were prepared to undertake, and said it was incumbent on them to advertise more freely. In connection with the exhibit by a prominent engineer at the Park Station it was inadvertently stated in a recent issue that the Publicity Department had not met him in an altogether sympathetic manner. This statement, the engineer in question states, is incorrect. Instead of being unwilling to meet his wishes, he says the officials were most courteous and obliging to him in respect of the object he had in view.

British Iron and Steel Conditions.

In Britain the resumption of working in the iron and steel industry is not yet general, but it is expected that the recent reduction of the price of coke to 30s. per ton will expedite matters. Manufacturers aver, however, that £1 per ton is the utmost price that the industry can afford, and urge the necessity of reduction of railway rates as a factor in profitable production. It is anticipated that Belgian and German competition will be less severe shortly, their quotations approximating more closely to those of competitors, and when the larger works in Britain are operating it is believed there will be no difficulty in securing good business. The iron blast furnaces are starting again, but the majority are still idle. A drastic cut in prices all round must, however, be made before any large quantities of iron and steel can be produced. Manufacturers are approaching the end of current contracts, which are not being replaced.

Successful British Tender.

Owing to the recent large reductions of English steel prices British manufacturers have secured a big contract for over 100 miles of water main for Bombay. This was obtained by a tender totalling 256 lakhs of rupees as against the lowest American tender of 377. This seems a happy augury for Britain holding her own in competition with the overseas markets.

Coke Price Reduction will enable Blast Furnaces to Resume.

The announcement is made that the Coke Association has reduced the price of coke to 30s. per ton delivered, which should enable blast furnaces to start again and iron and steel production to move.

German Activities.

The Krupp works at Essen, Germany, are, it is stated, employing more men than before the War, engaged in the production of locomotives, wagons and machinery of all kinds in large quantities. At Dusseldorf the production of locomotives and freight cars is proceeding on a very large scale.

The shipbuilding industry in Germany is, it is said, in a strong financial position and well equipped for an active construction policy.

Timber and Building Materials.

Timber is unchanged with, however, a downward tendency; 3 x 9 deals, 1s. 1d. to 1s. 2d.; scantlings, 1s.; floorings, 7d. to 7¼d.; ceilings, 5½d. to 5¾d.; beaver board, 4¾d. to 5d.; pitch pine, 8s. a cube; oregon, 7s.; corrugated iron, 9½d. to 10d. Business is fairly good, as there are a few building operations going on. A couple of boats from America with mining timber, principally pitch pine, have arrived, with a consequent decline in the price to 8s. a cube. Furniture timber: Burmah teak, 18s. 6d. per cube landed Johannesburg, for first quality, 14s. 9d. for seconds at the coast; American oak, 1s. 2½d. at coast; Japanese oak, 1s. 3½d. at coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cubic foot per truck load lots, in planks, at mills, Rhodesia; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12, Johannesburg; American pine shelving, 1s. per foot on spot. A large shipment of American white oak is on the spot, 1 in. to 2 in. and is being offered at 1s. per super ft. all through, but up to the present has found no buyers. Its real market value is 1s. 2d. at coast or 1s. 3d. here. The low price offered was to enable bills to be met. Bricks are ruling at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kilns; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; blue lime, 3s. 9d.; blue plaster, 4s. 9d. to 5s.; cement, 11s. 6d. a bag; damp, course and roofing, 37s. 6d., 47s. and 55s. 3d. for 1, 2 and 3 ply. In the building trade there is no change to report from last week. The deadlock between the masters and employees continue, but hopes are entertained that the dispute will be amicably settled.

Second-hand Iron and Timber Yards.

Business still remains slack in the second-hand iron and timber yards, but once the building dispute in the matter of wages is settled things are expected to improve. Second-hand iron is 5d. to 6d., timber 10d. to 1s. The present prices are reasonable and buyers, it is said, cannot expect much lower levels for some time to come.

Electrical Goods.

The tone is better and trade seems more buoyant, but business in town still continues very quiet and is only relieved by fairly good orders from the country. However, dealers think that things will be all right shortly if only the building employees will accept the masters' terms and settle down in earnest to work. There is a lot of work to be done, and as soon as the present trouble is out of the way there are good grounds for anticipating a big revival of business. Although there are no reductions of importance to report, the tendency is for prices generally to come down, and some alterations may be expected next month. As a matter of fact, there have recently been some declines on account of forced sales, but generally prices remain much about the same, those firms able to hold on not throwing anything

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away. Consignments from Britain are arriving steadily, with, however, no reductions, although these are expected to occur in the near future. Shipments from Germany are slower but still dribbling in, at prices a long way below British. Electrical wares are also arriving now from America fairly freely, showing slight reductions in comparison with British quotations.

Oil.

New York advises fresh weakness in Mexican and South American oil prices. Withdrawal from the Mexican field by American producers, because of the alleged confiscatory tax, caused Mexican petroleum to fall 9⅛ points to 90¼, which is a new record. Pan-American petroleum, the controlling factor in Mexican petroleum, also suffered a decline. On the other hand, Royal Dutch made a substantial gain. A "white" paper on the oil situation, recently issued in London, gives statistics on the oil resources of every part of the Empire; it shows an extremely small oil production and the absence of any general policy for the exclusion of foreigners from the oil-producing areas. No real parallel, it states, can fairly be drawn between the British Empire, with its small and scattered production, and a country like the United States, producing two-thirds of the world's output within her home territory.

Paraffin and Petrol: New Regulations.

New regulations in the *Gazette* fix maximum prices for 150 degree paraffin at ports as follows: To the retailer, 20s. 6d. per case, or 25s. per case of gallon tins. At other places prices as above plus railage and transport charges. Price to the consumer at the ports and all centres less than 400 miles therefrom, 22s. 9d. per case, or 11s. 5d. per tin, or 27s. 9d. per case of gallon tins, plus charges as above. At places four hundred miles or more distant from the ports, 23s. per case, 11s. 7d. per tin, or 28s. per case of gallon tins, and 2s. 11d. per tin, plus charges. Bottle prices at the ports, 7d.; elsewhere, 8d. Petrol prices (wholesale): At the ports, all brands, 29s. 3d. per case, or 31s. 9d. per drum; special brands from 35s. 3d. to 33s. 3s. At other places, prices as above plus charges. At other places the cost of transport and railage to be added. Retail: At the ports, all brands, 29s. 3d. per case, or 31s. 9d. per drum, plus 15 per cent.; smaller quantities, 4s. 6d. per imp. gall., and the case of gallon tins, "Shell" brands 5s. 3d., and "Pegasus" and "Zenith" 4s. At other places: All brands, 29s. 3d. per case, or 31s. 9d. per drum, plus 15 per cent., plus charges; smaller quantities, 5s. 3d. per imp. gall. (all brands), and others 5s. 9d. and 4s. 6d.

Cheaper Petrol.

The wholesale price of petrol of all grades is being reduced in Britain by 5d. per gall.

Synthetic Petrol.

A French professor claims to have succeeded in producing synthetic petrol from flax oil. He believes that other vegetable and animal oils can be used for the same purpose for motive power and in the manufacture of explosives, dyes and perfumes.

British Trade Outlook.

The July Board of Trade returns show that the recovery during the month from the effects of the coal stoppage was very slow, as was generally expected, but notwithstanding the returns show signs of a turn for the better for the first time for months. Compared with June exports and re-exports show an increase of £7,250,000 and imports a decrease of nearly £7,500,000. The apparent adverse trade balance for the month dropped to £28,000,000. Most of the coal pits are again working, but the price is much too high for buyers and for the great industries, with the consequence that many of those industries are unable to resume work, and stocks of coal are accumulating in many districts. Coal exports are practically at a standstill, foreign buyers refusing to pay the prices asked. The hardware and cutlery outlook is brighter, although many firms are working at a third of their productive capacity.

Local Industries.

In reviewing the industrial position Mr. J. Waldie Peirson, K.C., the chairman of the S.A. National Union, at a meeting held last week, emphasised the increasing interest which was being taken in the subject of local industrialism. There were now a large number of factories producing goods on a commercial scale. In his opinion, however, to attain real success it was necessary for manufacturers to combine to show the public the progress which had been made in recent years and to advertise on a much larger scale.

Conditions in Germany.

A gentleman recently returned from Germany after a somewhat protracted stay states that that country is recovering industrially, though what proportion of her export trade it had regained it was impossible to say. He thought its exports last year were something like 50,000,000 marks. Germany has the best crop in the making for three years, but this is the condition all over Europe. He considered that the efficiency of its manufacturing industries has been restored. The Germans, because of the low cost of manufacture, are underselling any other country on the globe in the case of products for which they furnish the raw material. For products made of imported raw material he estimated that the industries are three-fourths below pre-War standards. The disposition of the working class seems to be to help in the reconstruction of their country. They are working long hours, and in the factories using German raw material the wheels are running overtime. He considered the German Government to-day the best since the armistice. The men in power are honest, they realise that Germany owes a great debt, and they intend to pay it if they remain in power. As far as he was able to judge, the Government is well entrenched and there seems little danger of its being overthrown. Hugo Stinnes is beyond doubt one of the most powerful men in Germany, if indeed he is not the most powerful. He has wealth and all the influence that goes with it. He is an optimist as to the future of Germany, and he is not afraid to invest his money. He has had not a little to do with the recovery Germany has made.

German Dyemakers.

The German dye-makers are determined to exclude British dyestuffs. They have formed a strong combination, which will exact exorbitant prices for special dyes which cannot be obtained in Britain.

Belgium's Trade with Britain.

In the first six months of 1920 Belgium bought British goods to the value of 25 millions sterling, while in the corresponding period of 1921 they bought only 10 millions' worth. In the same period German sales more than doubled.

GOVERNMENT EXAMINATIONS.

METAL MANAGERS EXAM.: Last examination (May, 1921), **15** Metal Certificates were granted in South Africa, and of this number our students secured **10** certificates. Previous examination we secured **7** certificates from **8** entries, and in two other recent examinations **15** passes from **19** entries.

REMARKABLE AND CONSISTENT RESULTS.

COAL MANAGERS EXAM.: Last examination (May, 1921), we secured **3** certificates from **6** entries.

OVERSEAS EXAM: **21** certificates secured 1920, and **14** certificates to date, 1921.

SURVEY EXAM: We have secured practically **all** the certificates granted by the **Mines Department** during recent years and have obtained **60** certificates to date.

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American Shipping.

It is estimated that there are to-day some 60,000,000 tons of shipping in the world, compared with less than 50,000,000 at the outbreak of the War, with, of course, fewer cargoes to be carried than seven years ago. It is calculated that about one-quarter of the whole tonnage is idle to-day, and that the American share is the largest of all. It will be remembered that America, when she entered the War, went in for a vast building scheme and with little regard for the economies which normal times would have called for. At the moment the American Government possesses about 10,000,000 tons of shipping which it cannot run except at a heavy loss and cannot sell save at an enormous sacrifice. The new chairman of the Shipping Board admits that the problem of dealing with this surplus shipping is an appalling one. There are claims against the Government arising out of the Board's contracts amounting to 300 million dollars, and the loss on idle ships is put as high as 16 million dollars a month. As a commencement the Board are selling 287 wooden vessels to any one who will buy, failing which they are to be broken up.

Commonwealth Shipping Line.

Mr. Hughes, the Prime Minister of Australia, states, in reply to rumours concerning the intention to sell the Commonwealth line of steamers, that there is no foundation for such statements. The line, he says, has proved of such great value to Australia and her trade that it would be absurd to consider for a moment the idea of parting with it. The steamers, he states, are still operating at a substantial profit, and he predicted its gradual expansion.

Shipyard Joiners' Strike Ended.

After a strike lasting eight months, to the incalculable injury of a number of industries, the shipyard joiners are resuming work on the basis of an immediate reduction in wages of 6s. per week, with a further reduction of 3s. in October and a possible additional 3s. in December.

Cost of Living in Britain.

According to the *Labour Gazette*, the cost of living is on the up-grade again. The average level last month was 122 per cent. above the pre-War level, compared with 119 per cent. on July 1. The rise is due chiefly to dearer foodstuffs in consequence of the drought and increased rents in conformity with the Rents Act, but the price of meat and clothing has declined.

Empire Exhibition Fund.

Guarantees amounting to over £250,000 have already been received for the British Empire Exhibition Fund. The exhibits will show the progress and resources of the Dominions and their natural, educational and industrial features and mineral wealth.

Cheaper and Lighter Motor Cars.

A statistician in Chicago predicts the building of automobiles with a composition of cotton and operated with coal dust for fuel. The principal factor in the decline of the automobile business has been the steady increase in the price of gasoline. The car of the future, he says, will be run by other fuel. Already the use of coal dust has passed the experimental stage. In his opinion it will be used extensively within a short time. Lighter cars must be manufactured to cut down the cost of production and maintenance. A composition of cotton formaldehyde and glue is being used to produce a material that may solve the problem.

Rubber.

United States rubber, according to New York advices, was recently under marked pressure, but finished at a fractional gain in anticipation of favourable dividend action by the directors.

The next monthly meeting of members of the Geological Society will be held in the Main Hall, 1st floor, Scientific and Technical Club, 100, Fox Street, on Monday, 29th August, 1921, at 8.15 p.m.

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The Week's Meetings.

GENERAL MINING AND FINANCE.

Chairman's Speech.

The annual meeting of the General Mining and Finance Corporation, Ltd., was held on August 25. Mr. Leopold Albu presided, and in the course of his speech said:—Your chairman, Sir George Albu, who is at present in Europe for health reasons, asked me before leaving to preside at this meeting. As you are aware, I returned to South Africa only a few months ago after an absence of over 15 years. The changes which have taken place in that comparatively short time in the history of this vast country are truly amazing. Agriculture, then in its crudest infancy, has in the interval blossomed out into a great industry; so much so that today South Africa may be considered not only self-supporting in respect of foodstuffs, but able from its surplus to export to other countries. Of course we must not lose sight of the fact that the war has greatly contributed to this enormous expansion through the extraordinarily inflated prices ruling for food commodities, and although a wave of severe depression and price deflation has set in, which may last a considerable time, yet I feel confident that, in spite of this, the agricultural expansion at any rate will be progressive, and that South Africa is bound to become one of the great grain and meat producers of the world. It is quite amazing, too, to see what strides South Africa has made in industrial development during my absence. Who would have believed it possible that iron, steel and cement factories would spring up in so short a time, or that in the coal trade South Africa would so soon have become an exporter of considerable magnitude.

Mining Badly Hit.

On the other hand the gold industry, which should have profited more than any other by the war, has, I regret to see, come off very badly indeed through it. Whilst the price of gold, in contrast to any other commodity, remained stationary during the war, the cost of production continually mounted up, owing to colossal increases in wages, material, plant and everything in connection with mining. But this is not all. The efficiency of the workers has, I am sorry to say, gradually deteriorated, and we find to-day the existence of many mines threatened as a result of this fatal combination of high costs and low efficiency.

There can be no doubt about the seriousness of the position in which the gold mining industry as a whole finds itself, and unless wages are forthwith considerably reduced and pre-war efficiency at least is restored, you will witness within a short period the gradual closing down of mines which today are producing in the aggregate something like 250,000 ounces of gold per annum, and employing about 9,000 white men and 80,000 natives.

I hope the leaders of Labour will recognise in time the hopelessness of the position created since the war, and will without delay urge their unions to accept the inevitable reduction of wages, and especially to give that efficiency without which neither the gold industry, nor indeed any industry, can be successfully carried on. They must in their own interest cease to insist on maintaining conditions which are rendering a very large number of mines quite unremunerative, and will force them sooner or later to close down. The consequences of such an event will be deplorable. Not only will it deprive thousands of workers of their livelihood and the State of a considerable part of its revenue, but it will also appreciably reduce the spending power of the country as a whole.

A small beginning, I am glad to say, in the direction of reducing wages has already been made, but unfortunately no active steps have as yet been taken to improve the efficiency of labour, which, to my mind, is more than anything else responsible for the extraordinarily high costs prevailing on the Rand. It is not the shilling or two per shift more or less which will resuscitate the comparatively low grade mines of the Rand, but a drastic improvement in the efficiency of the miners. That, to my mind, is the real crux of the situation which is sapping the life blood of an otherwise well organised, sound and progressive industry.

Facts and Figures.

Mr. Albu then referred in detail to the affairs of the corporation as exhibited by the balance sheet and profit and loss account, which showed that a net profit had been made for the year of £53,913.

In commenting on the accounts, the Chairman said:

You are aware that during 1920 the market quotations for gold mining shares, which form the bulk of the investment of your corporation, were generally marked down, due to the prevailing high cost of operating the mines, combined with violent fluctuations in the price of gold, which in the early part of the year dropped from the high-water mark of 127s. 6d. in February to 102s. 11d. in April. It is quite obvious that as long as the price of our product rests, as it does now, on the unstable value of the £ sterling, the average individual will fight shy of investing his money in any but the richest gold mines, seeing that many of the lower grade mines are more or less dependent for their profitable existence on the premium at which they can realise their product, so long as the abnormal conditions of high costs and appalling inefficiency of labour continues.

Taking these adverse factors into consideration, it is not surprising that the general public, and particularly the investor, holds aloof from our markets in spite of the undoubted attractions which the colossal profits of a great many mines hold out, seeing that the investor demands, and reasonably, that he should have some solid grounds for believing that his dividends will continue for a more or less definite period at either the same or a greater rate per cent. than that on which he bases his purchase.

Seeing that, in the main, our activities are confined to the administration and management of the mining companies under our control, and that the interests of the corporation are largely bound up in their welfare, I will follow the time honoured custom of augmenting the remarks in your directors' report which deals with the operations of these companies for 1920 by giving a few facts and figures relating to the current year.

The operations of all the gold producing companies were adversely affected by a sharp drop in the price of gold, as expressed in sterling, from £5 16s. 5d. at the end of December last to £5 5s. 7d. at the end of January. From then the price generally sagged until it touched bottom, for the time being at last, at £5 2s. 8d. towards the end of May. After that time a slow rise took place until the end of July, when the price touched £5 15s. 2d. A setback has since occurred, bringing the figure down to £5 12s. He would be a bold man who would confidently predict the future course of these fluctuations, which, for the past year at any rate, have depended entirely on the trend of the American exchange.

In the face of such an unstable basis for the value of our gold, only economy and efficiency can overcome our difficulties, and a speedy recognition of this will be for the benefit of the whole industry.

Aurora West United G.M. Co., Ltd.

The decrease in the price of gold for January was at once reflected by a loss of £544 from the operations for that month. This was followed in February by a loss of £2,101, due partly to the same cause but in a greater degree to an unauthorised strike of underground workmen, which affected the majority of the mines on the Rand. Since February small monthly profits have been made, ranging from £264 in March to £1,264 in July, the latter figure being largely accounted for by the increased price at which gold was valued for that month.

Developments in the lower levels continue to be satisfactory, and for this reason the outlook for the mine has somewhat improved.

Meyer and Charlton G.M. Co., Ltd.

It is always a pleasure to review the activities of this mine, which has been and is one of the most consistently satisfactory producers of these fields. The profits for the first seven months of this year totalled £161,729, or an average of £23,104 per month. This would have been increased by about £10,000 had not the strike of underground workers in February caused the suspension of operations for nearly a week.

A large proportion of the ore dealt with is still being drawn from old workings, with the happy result that the ore reserves are not being depleted to anything like the extent that would otherwise happen. The effect of this on the working life of the mine is most important, resulting in a considerable extension of the time during which profitable existence is possible, thereby considerably augmenting the total profits earned.

New Goch Gold Mines, Ltd.

With the exception of the month of February, during which this company, in common with the majority of the others on the Rand, suffered from the effects of a strike among the underground workers, a small monthly profit has been made since the beginning of the year. How precarious is the existence of this mine, however, may be shown by the fact that the profit earned from January to July inclusive amounted to only £2,985, although during the same period a total of no less than £132,479 was spent in working costs.

Roodepoort United Main Reef G.M. Co., Ltd.

The fall in the price of gold rendered it quite impossible for this company to make profits between January and June, the loss recorded for this period being £10,628. In July a small profit of £315 was won. It has been evident for a long time that it is quite hopeless under present conditions to expect a profit from this mine unless gold is at a comparatively high figure, but on account of the throwing out of employment of a fairly large number of white men should production be suspended, losses have been faced in the hope that the result of operations over the whole year will allow at least of working revenue balancing working expenditure. As you will have seen from your directors' report the company managed to come out on this basis in 1920, although there was not sufficient surplus to pay interest on the loans made by your corporation. At the moment it seems doubtful if even this modicum of success will attend the efforts of the management for the current year, and if any further appreciable fall takes place in the price of gold the position will become hopeless, and nothing will remain but to close down, after a long struggle with adverse circumstances, unless radical improvements in working costs and in the efficiency of the workmen can forthwith be effected.

Van Ryn Gold Mines Estate, Ltd.

This mine continues to earn steady profits, work during the first seven months of the current year resulting in a surplus of £61 600.

Sand-filling is being proceeded with to an increasing extent, enabling a larger tonnage to be obtained from reclamation, thereby very considerably prolonging the life of the mine and adding a large amount to the earnings which would not otherwise be available.

West Rand Consolidated Mines, Ltd.

The results obtained by this company for the first seven months of the year show an improvement, the profit for this period being £34,564, as against £9,505 in the corresponding period of the previous year.

The programme of capital expenditure referred to at the last annual meeting, which had for its main object the exploitation and mining of the battery reef on an increased scale, is now nearing completion. Fortunately, sufficient profits have been earned so far to cover the outlay in this connection up to the present, and the corporation has not been called upon to advance any funds in order to carry out this work. It must, however, be borne in mind that further large capital outlay is necessary to equip and develop this mine on a scale commensurate with its claim area, but the policy in this direction will depend largely on future labour conditions and the results of the developments which are now being proceeded with. The suspension of payment of interest on and redemption of debentures is still in force, and will be continued until such time as the before-mentioned policy has been definitely decided upon.

Cinderella Consolidated Gold Mines, Ltd.

The mine is still unfortunately closed down, owing to the impossibility of raising funds under present conditions for mining ventures of this description. That a property with such vast potentialities should remain dormant for such a lengthy period is a fitting commentary on the conditions which have obtained during recent years, and emphasises the urgent necessity for the reduction of working costs to such a point as will render this and similar ventures attractive to capital. That this time will come I feel assured, as the inexorable working of economic laws will forbid the continuance for any very lengthy period of the present impossible conditions with regard to the cost of production.

Rand Collieries, Ltd.

There is, I regret to say, no change in the prospects of this company as a mining venture. The board, however, has decided to apply for permission to lay out small holdings on that portion of the surface which is never likely to be needed for mining purposes. This seems to be all that can be done until conditions are more favourable for considering the refinancing of the company with the view of restarting mining operations.

New Steyn Estate Gold Mines, Ltd.

I need not enlarge on the fact that from a mining point of view it is impossible to do anything at present with the ground held by this company. The mines of the Roodepoort district have all closed down except the Durban Deep and the Roodepoort United, largely through the pressure of economic conditions, and until these improve considerably there is apparently no hope of starting active operations on the large tract of reef-bearing ground held by this company.

Transvaal Silver and Base Metals, Ltd.

Last, but not least, I now come to deal with the latest offspring of your corporation, the Transvaal Silver and Base Metals, Ltd., to the future of which we attach no mean importance, for several reasons.

Since your last annual meeting active development has been carried out on the main lode of Dwarsfontein, and the old workings on Brakfontein have been opened up.

On Dwarsfontein something like 100,000 tons of highly payable ore are developed at the present time, and this quantity, naturally, is being increased as development proceeds.

In regard to work on the Brakfontein lode, the old shaft has been equipped with a temporary hoist, headgear, boiler plant, and air compressor, and has been unwatered, stripped to three compartments, cleared of debris to the bottom (a total depth of 132½ feet) and retimbered.

The old first level of the mine, which extends for a total distance of 130 feet, has been re-sampled, and shows 70 feet, or 54 per cent. payable, containing a value of 12 per cent. lead and 12.6oz. silver, worth about £5 per ton at present prices, over that portion of the lode which is exposed in the drive. The lode itself is strong and well defined, and its general appearance and values are most encouraging. It is proposed, as soon as the necessary pumping arrangements have been made, to sink the shaft to the plane of the second level, and to carry out development both on the first and second levels, in order to test the value of the lode in depth and on the extension of the present workings.

At our last meeting your chairman informed you that it had been arranged to provide a de-sulphurising plant and small smelting furnace, in order that the mine might be brought to a revenue-producing stage as soon as possible. Since that date it has been decided considerably to enlarge upon the original scheme, and to erect the first unit of the permanent plant, consisting of a sorting and crushing station and concentration plant, as well as the de-sulphurising and smelting plant previously mentioned. This plant should be capable of dealing with 7,500 tons of ore, and of producing 750 tons of bullion per month, worth, at present prices, approximately £29.000 when working to full capacity. In connection with the new installation it was also decided to provide an electrical generating plant, and to instal a permanent hoist of more powerful capacity at the No. 1 shaft. Fortunately the company was able to procure locally a considerable proportion of the plant required, and in regard to those portions of the plant which had to be imported from Europe, it is satisfactory to note that all items have been either delivered on the property, or are on the water.

At the present time the de-sulphurising and smelting plant is nearing completion, and foundation work, both for the sorting and crushing and concentration plants is in hand. The electric generating plant and additional boiler have been erected, and are ready for use.

It follows, therefore, that within the next few months the whole plant should be in operation, and I think you will agree with me that it is a cause for congratulation in the case of a company which was formed only in December, 1919, that it should be brought to a producing stage in such a comparatively short time.

So far as the future of the Transvaal Silver Company is concerned I am somewhat diffident in committing myself to definite predictions, since, in spite of the active development policy which has been so successfully carried out following the installation of the new air compressing plant, we have as yet barely scratched the surface, having regard to the enormous area of the company's holdings. Nevertheless, judging from the developments so far accomplished, both on Dwarsfontein and Brakfontein, I have no hesitation in saying that in these two mines alone the Transvaal Silver Company has an asset of great possibilities, and that we may reasonably and confidently look forward to the eventual fulfilment of the great expectations we have all entertained in connection with this venture.

I may mention that in order to complete the plant and bring the company to the producing stage, the capital of the company was increased in May from £140,000 to £300,000 by the creation of 160,000 additional shares of £1 each. This new capital was guaranteed by your corporation at 21s. per share. Of these shares 140,000 were offered to existing shareholders at the same price, and nearly 100,000 shares were taken up by them.

White Labour.

Since I last addressed you, we have had to deal with quite a number of minor differences between the industry and its employes. On the whole, however, I am glad to say, we have reason to believe that the spirit of "give and take" is gaining ground, and that the men are beginning to realise that the counsels of the extremists are not for the ultimate benefit of the rank and file.

During the month of February last, owing to the action of these extremists, a strike of underground workers occurred which affected most of the mines of the Rand. The cause of this strike was the refusal of the management of one of the mines to suspend a shift boss at the request of the shaft stewards. This strike took place without the authority of the executive of the Mine Workers' Union, which endeavoured to get the men to go back to work, but for some time without success, owing to the fact that several branches of the union, more especially in the central area, were at that time ruled and run by extremists. The industry was involved in serious losses on account of the stoppage, and the strike was also, as is nearly always the case, detrimental to the workers themselves. The moderate element in the miners' union eventually gained control, and, through their influence, the men ultimately returned to work. I do not wish to rake up old scores, and merely mention this incident to illustrate how detrimental hasty and ill-considered action is to employers and employes alike, and that strikes do not remove, but increase difficulties.

I wish here to congratulate the Mine Workers' Union on its action in bringing to book those of its members and officials who were responsible for the strike, and excluding them, for the time being at least, from positions of influence in their union. A continuance of this sane and reasonable attitude will, no doubt, very greatly assist the smooth working of the industry.

Since the beginning of the current year, the cost of living has experienced a steady decline, and, on that account, after rather protracted negotiations, a sliding scale of wages has been adopted, so that the men's wages will rise or fall in accordance with the cost of living. This will form a good starting point for that campaign of economy and efficiency which is so essential to the successful working of the gold mining industry. In this connection, it seems to me to be very necessary to do away with, or drastically modify, the present form of underground contract which allows miners to earn accidentally very large sums of money, often quite out of proportion to the services rendered. This state of affairs makes it difficult to get really good men to accept official appointments underground, seeing that the salaries offered, although quite adequate, are substantially less than can be earned by a good miner on contract, so that, while the contract system as at present existing may give good results in individual working places, it no doubt tends on the whole to decrease efficiency.

I would also urge upon the unions not to hamper the working of the mines by insisting upon the observance of hide-bound rules regarding conditions of work, which can only operate ultimately to their own detriment by rendering unprofitable many low-grade mines which would, under more favourable conditions. continue for many years to give remunerative employment to large numbers of white employes. There is no wish on the part of the employers to force workmen to accept inadequate wages, but it is a hard economic fact that no industry can continue unless value is received by employers for wages paid to employes.

Even if, under the present conditions of society, differences are inevitable over the proportions in which the results of industry should be divided between employers and employed, there does not seem to be any rhyme or reason in limiting the total amount produced, as the result of this must be that there is less to divide, a consummation which cannot be of advantage to anyone concerned.

Native Labour.

Owing to the closing down, from various causes, of several gold mines which employed in the aggregate a considerable number of natives, and to the temporary suspension of operations on most of the diamond mines in South Africa, the position as regards native labour for the gold mines remaining at work has been somewhat easier, although in the case of many mines the numbers available are still inadequate to carry on operations in the most economical manner. Any general resumption of diamond mining or the opening up of new or dormant gold mines would again cause the shortage to become acute, and for that reason it is much to be regretted that the Union Parliament did not see its way to sanction, during the last session, the introduction of natives from north of latitude 22deg. south. With the ever-increasing demand from other industries there is no doubt that the native labour supply available in the Union is inadequate, and if the country is to go ahead other sources of supply must be developed. It is also becoming increasingly evident that the operation of the so-called colour bar is becoming more and more unjustifiable, and that in the future the native, as his intelligence permits, must be given more responsible work in order to develop the resources of this country economically. I feel certain that the abolition of the colour bar would scarcely affect the white man at the present moment, and would in the end, by enlarging the sphere of employment, provide work for many more than are employed at present. If the Labour Unions would only take this long view, their members would, I am sure, come to the conclusion that this artificial barrier is really detrimental to their own best interests, as it undoubtedly is to the interests of the country at large.

Besides, I do not see how this bar to the advancement of the natives can be justified on moral grounds, and already there are definite signs that the native himself is waking up to a sense of this injustice. The fact is that the native of South Africa is becoming educated. Through education his ambition is being developed, and, unless an outlet is provided for that ambition, which the present restrictions prevent, there can be but little doubt that the time will come when the native himself will force the issue. Naturally, I do not suggest that the white man and the native should be placed on terms of social equality—that, of course, is unthinkable. At the same time, however, I do feel that an opportunity should be given to the native to advance gradually, and, in order that this may be attained, without unduly affecting the position of the white man, I suggest that he should be allowed to take over some of the unskilled and semi-skilled work which is now performed by whites, to the detriment of the industry as a whole, and to the disadvantage of the whites themselves, many of whom, through this system, have little or no chance of ever fitting themselves for skilled work.

At the moment we hold the key to the position. Let us rather unlock the door now and allow a limited number of natives to pass the portals, than keep the door shut and, ultimately, be overwhelmed by the crowd after the door has been burst open.

I wish to express our appreciation of the services rendered by the officials and staff of the corporation, both in Europe and in this country. Our thanks are also due to Mr. Erroll Hay, our technical adviser, and to the managers and other officials of the mines controlled by us for the loyal manner in which they have carried out their duties during what has been for most of the mines a particularly trying year.

In concluding my address, let me express the hope that before our next annual meeting many of the drawbacks and difficulties under which we and the industry have been suffering during the past few years will have been relegated to the limbo of the past, and that as a consequence your chairman will then be able to lay before you a more satisfactory picture of the affairs of your corporation and, generally speaking, of the companies under its control.

The report and accounts were unanimously adopted.

Zaaiplaats Tin.

The Zaaiplaats Tin quarterly report for the period ended July 31st states:—The mill ran 21 days 16 hours 40 minutes (15 stamps—24 hours' basis) crushing 2,562 short tons, the duty per stamp being 8.8 tons per 24 hours. In addition 1,626 tons of sand were treated. The output for the quarter amounted to 30.45 long tons of concentrate of an average assay value of 65.92 per cent. During the quarter no tin was smelted. Concentrates are now shipped to the Straits Trading Company. The results for the quarter show an estimated loss of £799 13s. 5d. before providing for directors' fees and Government taxes. Early in July a start was made to resume sinking in the main face of the lease workings; 15 ft. of sinking was done during the month of July. The country through which the 15 ft. of work was done is very much fissured and broken. Pannings taken daily along the last 10 ft. show from traces to ¼ per cent. tin values and payable values are looked for as soon as the face is in more settled formation. In No. 13 two small branch pipes were driven on. The results from one of the pipes have so far been satisfactory. A start was made to follow a patch of good ore in one of the branches of No. 20 shaft. From the 1st August only one pump will be kept running at the pumping station and the battery will only be running when ore bins are full. Nos. 5, 6 and 13 workings are being cleaned up and it is hoped by screening through 1¼ in. mesh and careful sorting of the oversize to grade the ore to 2 per cent. and also to reduce milling, pumping and roasting charges. A higher grade of concentrates can reasonably be expected, and compared with the ore treated in July, the stuff from Nos. 6 and 13 is practically free milling. The average number of Whites employed during the quarter was 11 (eleven). The average number of Natives employed on the property during the quarter was 161. The number at the end of July was 157. The rainfall for the quarter amounted to 2.08 inches. Surface prospecting was carried on during the months of May and June, but nothing payable was located. From the 1st August the monthly mine expenses at Stavoren will be reduced to £20

NEW PATENTS.

742. John Peel Nelson.—Improvements in lime burning and lime kilns.

744. Theodorus Hendrik Nakken. Means for transforming light impulses into electric current impulses.

743. William Ludlow Estabrooke and Daniel Dana Jackson.—Process of desulphurizing iron ores, iron and steel, and coke used in the metallurgy of iron.

745. Lionel George Preston, C.B., Harold Morris-Curey, George Shearing and Cecil Lewis Fortescue. Improvements in and relating to the generation of continuous waves for wireless telegraphy and telephony by themionic valves supplied direct from a low-frequency polyphase circuit.

746. The Dunlop Rubber Co., Ltd.—Improvements in or relating to wire spoked wheels.

749. Marconi's Wireless Telegraph Co., Ltd.—Improvements in or relating to aerials for use in wireless signalling.

752. Roadrails, Ltd.—Improvements in locomotives for light railways.

755. Segnin Fisher.—Improvements in supplying water to rock drills

765. Thomas Grieg Ironside.—Improvements in the process of distilling oil shales, coal and other carbonaceous material and in apparatus therefor.

779. James Hamilton Anstruther Macadam. Improvements in linings for tube mills and the like.

781. William Anderson Welsh and Alma Thomas Elliott.—Fuel economiser for motor engines.

782. Alfred William Mantle.—Auxiliary oil pumps and tank for Ford motor car.

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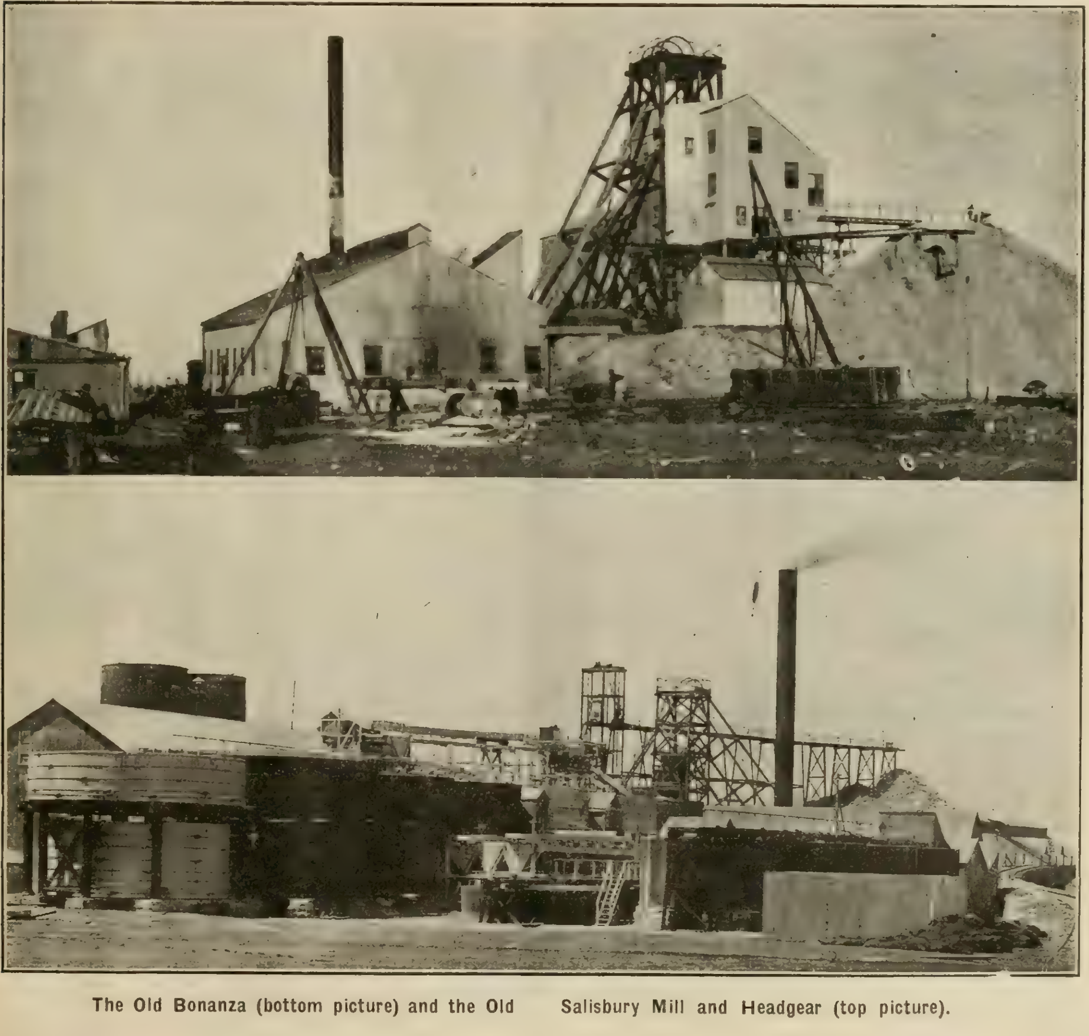
Vol. XXXII., Part I JOHANNESBURG, TRANSVAAL, SATURDAY, SEPTEMBER 3, 1921. No. 1562.

TWO PIONEER GOLD MINES OF THE RAND.



The Old Bonanza (bottom picture) and the Old Salisbury Mill and Headgear (top picture).

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Tube Milling Practice on the Rand.

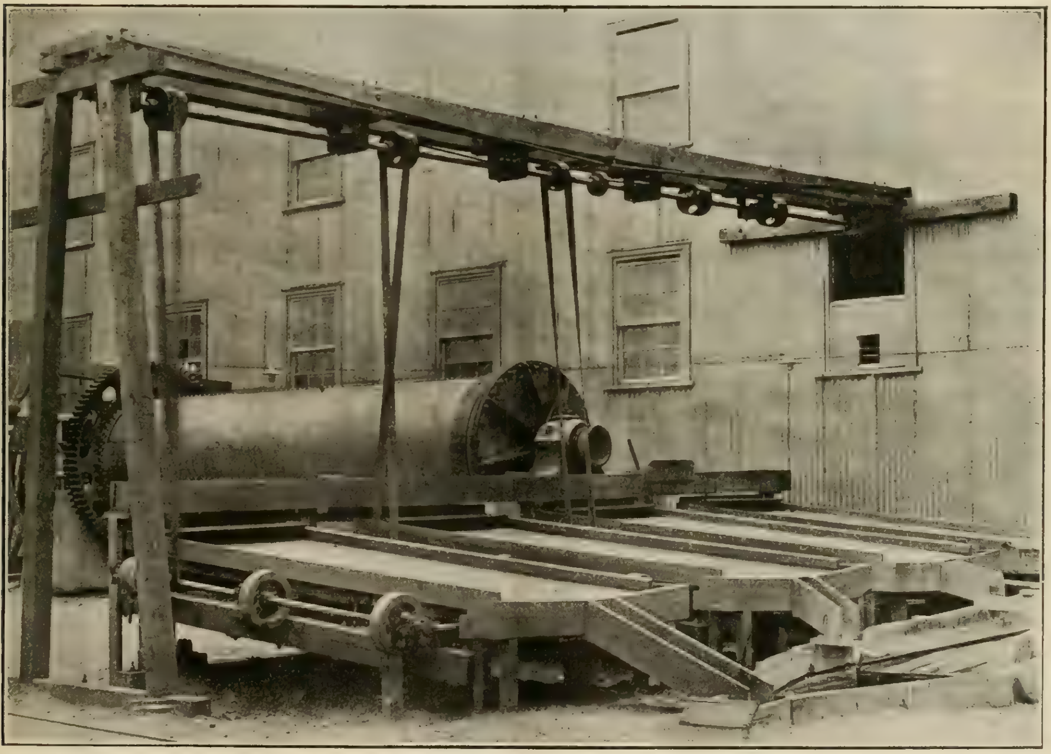
WESTRALIAN EXPERIENCE—PART PLAYED BY DR. DIEHL AND MR. H. S. DENNY—AN INTERESTING CHAPTER ON RAND METALLURGY.

The history of the introduction of the tube mill into Rand metallurgical practice is a fascinating one, dating back to 1904. The accompanying photographs are of historic interest, one showing the first tube mill at work on the Glen Deep in 1904 and the other a modern battery of tube mills at Springs Mines.

As applied to the ores of the Rand it appears that the necessity for regrinding the coarse portion of the crushed ore was realised as far back as 1894. J. S. Curtis in a paper read before the Chemical, Metallurgical and Mining Society of South Africa recommended the regrinding of the tailing, leaving the concentrators and reconcentrating the finer product. The whole process depended on amalgamation and concentration after each crushing or regrinding. Cyaniding, although known at this time, was not relied upon for the final treatment of the tailing.

In 1903 a finer crushing before cyaniding the coarse and pyritic portion separated by spitzluten of the pulp leaving the plates was foreshadowed. In the same year E. D. Chester recommended the separation by means of screens and regrinding that portion of the crushed pulp which would not pass a screen of 900 holes to the square inch.

A MILESTONE IN THE METALLURGICAL HISTORY OF THE RAND.



The First Tube Mill on the Rand.

Although the advantages of fine crushing of banket ore had long been recognised, it was not till 1904 that any serious steps were taken to actually do this on the Rand. Western Australia led the way in the treatment of its telluride ores by very fine grinding in pans by which it was found that the extractions were materially improved. The South African War lasting from 1899 to 1902 necessited the shutting down of the Transvaal mines, and it was during this time that the West Australian gold fields made such strides in the development of finer reduction of its ores by means of pans and tube mills. These last were introduced in 1899 by Dr. Diehl for the sliming of telluride ores.

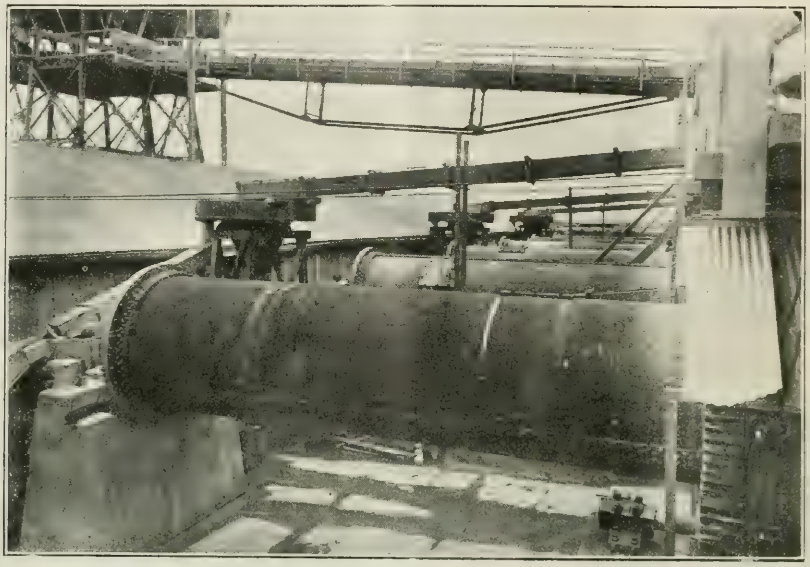
H. S. Denny, in a paper read before the Chemical and Metallurgical Society of South Africa in July, 1903, advocated the introduction of tube mills to reduce to a slime the concentrate produced by vanners, but it was not till May, 1904, that the first tube mill working in circuit was started on the Glen Deep Mine, followed by one for crushing vanner concentrates on the New Goch a few days later.

In October of the same year the Rand Mines and Eckstein groups adopted tube mills for their properties. Experiments in this direction were carried on by the metallurgical and engineering departments at Corner House with the view of perfecting a design of their own. The large increase in profit at the Robinson Deep Mine resulting from the introduction of tube mills a year later was followed by a general acceptance of the economic value of these machines on the Rand.

The following account, taken from a back number of this journal, throws light on the progress made:—

The Witwatersrand's first tube mill year has just been concluded, and looking back on the magnificent progress attained during 1906, it is quite clear that the introduction of fine grinding practice has in a large measure accounted for the declaration of larger outputs, greater profits and more substantial dividends. There are at the present time about fifty-nine tube mills working on mines which employed about 3,500 stamps. How stamp duties have been improved, residues lowered, and working profits enlarged on these properties is now ancient history, but tube milling practice, it should be remembered, is as yet in its infancy.

Since then the subject has been studied from all points of view, both theoretical as well as practical, with a resulting improvement in the work achieved by the tube mill. The stamps have been made to deliver a coarser product, and a greater load has been added to the tube mill circuit. This has resulted in larger stamp duties, and one finds the number of stamps per tube mill has diminished. While at the end of 1906, 59 tube mills were supplied by 3,500 stamps, *i.e.*, the tube mill by approximately 60 stamps, in present day practice the tube mill is fed on the average by only 23 stamps.



A Battery of Tube Mills at the Springs Mines.

U.S.A. Trade with South Africa.

According to cable advice just received from the American Department of Commerce, of which Mr. Herbert Hoover is secretary, by the American Trade Commissioner, Mr. P. J. Stevenson, the readjustment of business conditions in America is approximately complete. Two indications that the United States have almost returned to normalcy are the increasing production of manufactured lines and the stiffening of wholesale prices. During July American exports to British South Africa totaled $1,400,000, which indicates a resumption of local purchases in the American market. While July imports from South Africa were only $451,000, in view of the betterment in domestic conditions, a continued improvement in the exports of South African products may be expected. The latest available statistics of trade between South Africa and the United States are those for May. Wool imports from South Africa for the eleven months ending May, 1921, were 17,913,686 lbs. of clothing wools, 1,537,866 lbs. of carpet wools, and 315,630 lbs. of mohair, of a total value of $5,112,072. The slump in prices is reflected in the fact that while the volume of clothing wools imported fell by 55 per cent. prices fell by 80 per cent. Similarly, imports of South African sheepskins for the eleven months ending May, 1921, compared with 1920, fell from 5,111,018 to 3,134,841 lbs., but in value from $3,128,380 to $1,459,994. Total imports of South African products for this period were $10,243,152 compared with $35,156,602 in 1920 and $32,076,393 in 1919. American exports to British South Africa during the eleven months ending May, 1921, totalled $45,906,609. This is an increase over the same period for 1920, when exports were $43,126,600, and for 1919, when they were $40,644,018. Considering the exchange handicap and the lower price levels that have prevailed, the increase is especially noteworthy. Among the leading lines purchased in the eleven months ending May are several of particular interest. Large increases were registered in mowers and reapers, ploughs and cultivators, and wrought-iron piping and fittings, while the following were double the 1919 or 1920 figures: Tyres, typewriters, naptha oils and steel plates. Other lines of importance were motor cars, hosiery, cotton goods, leather manufactures, including boots and shoes, wire, and iron and steel products. Barbed wire exports were ten times those of 1919, while petrol exports, both by volume and value were approximately 500 per cent. greater than in 1919.

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WRIGHT'S ROPES

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The Possibilities of Applying Flotation to Rand Gold Ore.

The development of the flotation process represents the most important advance made in ore dressing methods within recent years. It has solved the low-grade sulphide ores, propositions of copper, lead, zinc, and many other mines. Is it possible that its application to Rand gold ores will in any way render our low-grade ores payable and revive interest in abandoned portions of our goldfields?

No work upon this subject has been done with the object of determining the possibility of applying flotation to local ores, but certain figures reproduced from an article entitled "Distribution of Gold in Banket Ore Classified Products, with Reference to Milling and Cyaniding Operations," by Mr. F. Wartenweiler, read before the Chemical and Metallurgical Society of S.A., throw considerable light upon the subject. In the experiments flotation was adopted in order to obtain the information sought, and hence considerable data in this respect are shown. The following reproduction from the Society's journal describes the flotation process adopted:

"Tests were begun using a motor-operated laboratory flotation machine supplemented by panning of the tailing to separate any coarse pyrite and gold which had not been lifted with the froth. All samples for flotation were ground to pass a 150-mesh linear screen. Various flotation oils were given a trial, the combination finally adopted as the most effective being wood tar oil and turpentine in a circuit acidified with sulphuric acid. It was found necessary to vary the amount of acid with the class of product treated. A final washing effect in respect to pyrite was secured by the addition of a fractional quantity of wood tar oil toward the end of the flotation agitation. The separation of the pyritic portion was by observation clean, this being confirmed by sulphur determinations in the tailing, which gave such low sulphur content in terms of pyrite as ·16 per cent. FeS_2 and ·08 per cent. FeS_2."

Some of the results obtained were as follow:—

Origin of Sample.	Sample.	Products.	Per % by wt.	Value dwts./ ton.	% by vauel.
Ferreira Deep ..	Cy. pulp.	Concentrate	5·81	36·2	87·5
	2·4 dwts./ton	Tailing	94·19	·32	12·5
	Slime change	Conc	4·51	22·0	63·5
	1·56 dwts./ ton.	Tail	95·49	·60	36·5
Village Deep.	Cy. pulp	Conc.	—	—	90·3
	3·08 dwts./ ton.	Tail.	—	—	9·7
	Cy. pulp.	Conc.	—	—	88·9
	2·64 dwts./ ton.	Tail.	—	—	11·1
City Deep.	Sand change.	Conc.	2·2	104·8	81·7
	2·83 dwts./ ton.	Tail.	97·8	·53	18·3

A close study of the figures discloses some very interesting facts. We find in all cases that a concentrate of sulphides, which represents only from 2·2 per cent. to 5·81 per cent. of the total weight of the ore treated, and which at the same time contains from 63·5 per cent. to 87·5 per cent. of the total gold present in the ore, is produced. This clearly shows that a very high grade of concentrate can be produced from some samples of local ore. It must be borne in mind, however, that panning was used in conjunction with flotation, and that the high grade concentrate cannot be attributed to flotation alone. However, the high ratios of concentration obtained make the subject one which is worthy of very close investigation from the point of view of the application of flotation.

The chief advantage of such a system of concentration would be the reduction of the large tonnage of crushed ore to be treated in the extraction processes. For example, take a mill treating 1,500 tons per day and which would produce a 5 per cent. concentrate. This would mean that only 75 tons of material need be treated in the extraction plant. This smaller tonnage would require a smaller plant with less labour and conveying expenditure attached to it. The tailing produced in such a plant would run higher in gold content than that produced in present practice, but this apparent lower percentage extraction will in no way hamper the economy of the process as it would be attended by a lower extraction cost. The factors contributing towards a higher tailing product are twofold:

(1) The tailing value discarded from the flotation units.

(2) The residue value from the sulphide concentrate.

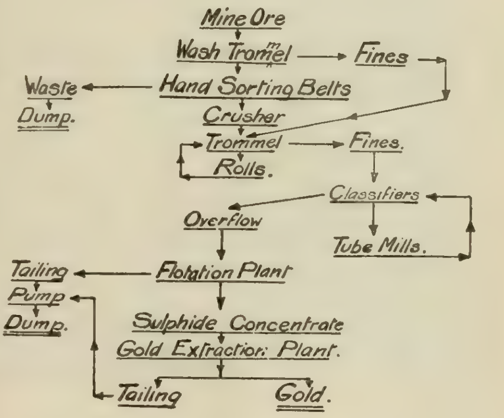
Working costs, on the other hand, will be brought down by the following:

(1) Less labour required on complete flotation plant.

(2) Working costs reduced by the elimination of a large tonnage of tailing before extraction takes place.

The extraction of gold from high-grade concentrates will present technical difficulties which are not met with in usual Rand metallurgical practice. There are various processes by which these concentrates coud be treated, and in the choice of the most suitable process one can only be guided by the results of a very close investigation of the problem.

FLOW SHEET. POSSIBLE FLOTATION PLANT.



Other points which would require investigation are the following: The extent to which crushing must be carried in order to produce the most economical extraction. The selection of the most suitable flotation oil to be used under definite conditions. A close study of the economy of the process as a whole as compared to present Rand practice.

The accompanying flow sheet represents a possible application of flotation concentration to Rand ore. The flow sheet represents only the essential details of the plant. The crushing plant must be designed to give the most efficient working with the removal of fines from the product of each set of crushers before the following stage is reached.

The large tonnage of tailing produced from the flotation units is conveniently disposed of by means of a pump, and the present rather laborious system of handling this material is done away with. The water from the tailing will be free from small quantities of cyanide, and can readily be recovered in the usual way.

Bearing in mind the few facts which have been discussed, it appears that a possible field for flotation could be established on the Rand. Apart from that consideration, the subject is one which is worthy of the attention of those interested in research, and, if pursued, may add largely to existing knowledge of the metallurgy of Rand gold ore.

Gold and the U.S.A.

Gold imports into the United States in the fiscal year just ended aggregate, in round terms, $650,000,000, or more than in any year except 1917, when they aggregated $977,000,000, says a statement by the National City Bank. Of course, adds the bank's statement, not all of the $2,630,000,000 of gold imported since the beginning of the war has remained, for the gold exports in the same period (1914-1921) aggregated $1,435,000,000, leaving the net imports (in excess of exports) for the entire period of 1914-1921 $1,190,000,000, while the $530,000,000 turned out by our mines during that period brings the total additions to U.S. gold stock since 1914, by importation and domestic production, up to $1,725,000,000, of which, however, nearly $300,000,000 has been used for industrial and scientific purposes, leaving the net additions, since 1914, to U.S. gold available for currency purposes about $1,350,000,000. It is not surprising then that the Circulation Statement of the Treasury Department shows the total stock of gold in the United States on June 1, 1921, as $3,175,000,000, against $1,892,000,000 at the beginning of the War.

What has the remainder of the world done about gold for monetary purposes meantime? The reports of the Director of the Mint showing the "approximate stocks of money in the principal countries of the world" put the total of gold for all countries for which statistics were available at $8,240,000,000 at the beginning of 1914 and $8,340,000,000 at the beginning of 1919, though the 1919 tabulation fails to include figures for certain countries which are known to have been at that time about $500,000,000, suggesting that the total of the world's gold stock at the present time is nearly $9,000,000,000, though only a small proportion of this is in actual circulation, most of it being held in banks and public treasuries as a basis for the enormous paper circulation.

This world total of approximately $9,000,000,000 of gold stock available for currency seems to add weight to the often-expressed belief that only about one-half of the world's gold production passes into coin or becomes a basis for currency, since the known figures of gold production from the discovery of America to the present time show a grand aggregate of $18,000,000,000, of which total about one-half is now recorded as in existence, either in the form of coin or as a basis for circulation. Curiously, too, about one-half of this enormous total of $18,000,000,000 produced by the mines of the world has been turned out since the famous gold versus silver campaign of 1896, since the records of world gold production show the total outturn from 1896 to 1921 at $9,335,000,000, out of a grand total of $18,115,000,000 form 1492 to 1921. The share of the United States in the existing gold "monetary stock" of the world has advanced from about 22 per cent. prior to the War to approximately 37 per cent. at the present time, though this figure as to present conditions can only be a rough approximation owing to the difficulties of obtaining late figures for certain countries under the now existing conditions.

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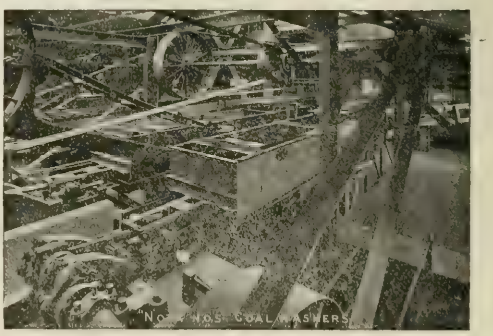

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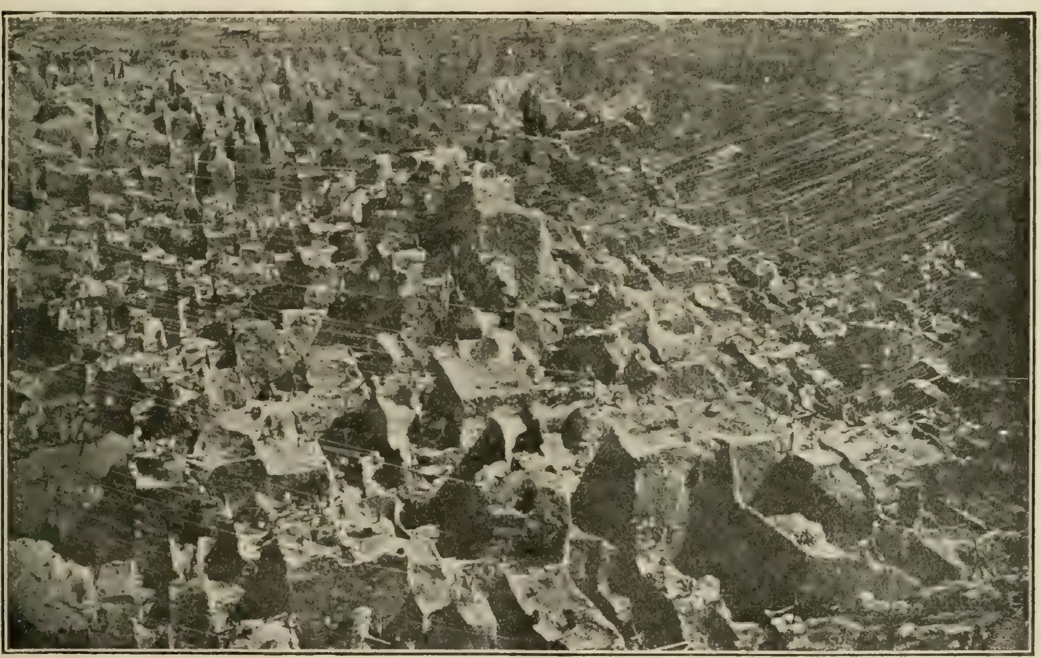
De Beers Fifty Years Ago!

By W. P. Taylor.

In this interesting article Mr. Taylor tells of the early days of De Beers and of some of the many notable personalities of Kimberley.

De Beers—a name to conjure with! And what has been conjured with it? Out of the veld—as Venus arose from her shell—De Beers arose. Little thought of in the early activities, it suddenly held sway and became known to the world of civilisation, for next to the name of Rhodes, De Beers will be known, long after its mines are dead holes with their long-held riches exhausted. And why should De Beers not go down to posterity? For though it has been known to the world as a great Diamond Corporation, has it not been a mighty force behind a mighty man? When great things were to eventuate, was not De Beers coupled with the name of Rhodes? If Rhodes was the magician, De Beers was his talisman, for was not De Beers, Beit, Rudd, Rothchilds, Barnato, Compton, Wernher, Stow, English, Theald, Shields, Harris, Haarhoff and Oates? The commonsense of its directors never denied supporting progress.



The Kimberley Diamond Mine in the early days.

Old Kimberley.

In its early activities De Beers made Kimberley. Its beneficence promoted much that would otherwise have been left undone. Its work spread from the Cape to the Equator, and though it had its god, it in reality was the god behind the machine. When the first river diggers abandoned their claims on the slopes of kopjes, selling their cradles, they made for the new life of dry-sorting on the lime craters at De Beers. Their road wound round the " Bend of the River," past Shepherd's Store, and as the great flat lengthened, on their left lay a huge pan, which in flood-time was covered by myriads of ducks and geese. Twelve miles south was the new Eldorado. Great camel-thorn trees covered its hill, society birds had thatched their snug home in wide branches; then man's invasion meant their ruin. The sun rose over the distant Boshof hills, and its glinting rays struck Blanckenberg's Vley, which filled a deep hollow to the east. White tents were dotted amidst the wooded veld. The mine was known as " Old De Beers," named after its owner, one De Beer. The farm that carried the mines was known as " Vooruitzigt." It was bought by Messrs. Dunnell Ebden, Henry Stockdale, Hurley and others, and its owners received a share of licences. In later years Mr. R. W. Murray, a member of the Crown Parliament, urged the Government to purchase the estate, which they wisely did, and its results reflected his perspicacity. Old De Beers never really developed like the Pan and Kimberley. It never had its own market. Before Kimberley was discovered all the De Beers marketing was done at the " Pan "; afterwards it was transferred to Kimberley, but De Beers never got beyond having its church and stores.

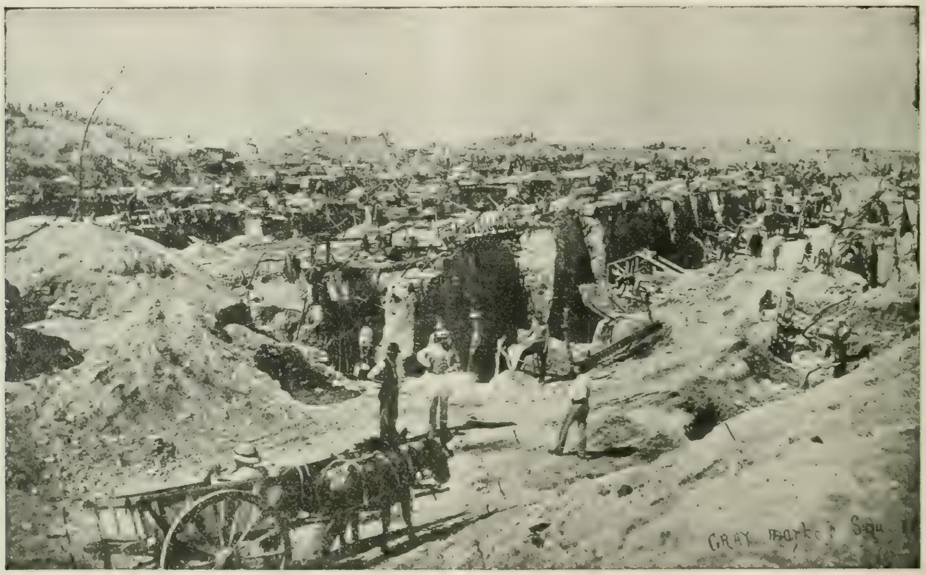
The Old Diggers' Committee.

There was the old Diggers' Committee, where the early differences in connection with Rhodes' water pumping contracts were fought out, but it was an easy community to deal with—mostly men from Natal and the Colony whose former occupation made diamond mining easy, and as the majority did fairly well they never troubled too much about the future. Some of these men came with the mine's inception and followed its fortunes until they found themselves directors of the wonderful great combine, and millionaires; but this really only through their blind adherence to Cecil Rhodes, who was the manipulator that shaped their ends.

At first De Beers was a terribly slow-going proposition, a very Cinderella. Every attention went to Kimberley, which developed into an intensely busy hive. The hundreds of windlasses whirling round and round, little buckets racing, Kafirs screaming, carts trundling, dust blowing, everyone hurrying—that was Kimberley. But De Beers then only had its limited number of individuals working large blocks of claims. It was intersected with great bands of floating reef, and where the rich claims were worked below the water level they quickly filled, and then there was the prospect of a long wait, and the question of ways and means to get out the water, and all this went slowly, whilst the sister mine, Kimberley, raced along. The western part of De Beers, to a depth of a hundred feet, was extremely poor, at that time absolutely unpayable. A sale of claims in 1874 averaged about £5 a claim. In its south-eastern part it was little better. Lippert Brothers acquired a large block of ground in 1875 and for years they heaped up losses. James Ferguson put in years of hard work and energy with the same ground, but to little purpose. To the south Thaine, Allen, Mosenthal Brothers, George MacFarlane, Petrie and others wasted money and time over a problem that only Rhodes could solve. In fact, be it Poor Man's, Schawbe's, Australian Gully, or the very mine itself, worked as it had been in a disconnected way, with ribs of shale and great masses of non-paying yellow, it was impossible to make it pay; as impossible as it was to work any of the mines without a general combination for marketing its diamonds through one channel.

Gradual Changes.

Gradually all these changes took place. The little claimholder gave way to the firms, who worked blocks of claims: Rhodes and Alderson, Dunsmure, Beit, Wolhuter and Harris, Rowe, Gem and Slatter, Robinson and Slatter, Stow and English, Compton Brothers, Shields and Anderson, Blackburn and Breda. These and others were the survivors of the fittest. The Maines, Wrights, Taylors, Hellets, Grays, Schawbs, Bennett, and many others had all succumbed. Then worked by steam, these various blocks soon kept rotary machines going full time, and John Birbeck did a large buying business with them. The diamonds, as I have said before, differed. Each mine had its peculiarities, and those conversant could pick out and recognise from mixed parcels stones from various mines.



Early Days on the Diamond Fields: the Kimberley Mine in 1872.

Varieties of the Diamond.

The diamond has been thoroughly described by various writers, but as a digger I often wondered at its numberless quaint forms. The octahedron was perhaps the commonest. There were the sharp-edged glassy stones that are pictured from old time as a diamond's shape; then there were great yellow ones, rounded and roughed; sometimes the triangular macle, nature's emblem of Masonic history; two triangular pieces, formed and cemented with its own impervious matter and edged with a seam that sometimes resembled a fine stitching. There were the round white lozenges, and at De Beers there was a stone that was flatter in shape, but with many soft sides. They called stones macles, octahedrons, do-octahedrons, and do-do-octrahedrons, but I think the De Beers beauty was a sexto of some kind, and it infatuated me more than any of the various other shapes. True, it hardly ever was pure white. That was reserved for octahedrons and the frosty-faced stones. The great mass of brown diamonds mostly trended to glassy stones. In the forming of a diamond there is some colouring gas, and this, predominating and remaining in the stone, must have given the various yellow and brown shades. The De Beers mine produced, I dare say, as even a class as any other, but the Wesselton and Jagersfontein mines have been known for their extreme whiteness. The largest mine, of course, in the world, is the Premier, and it produces wonderful colours. Its brown stones deepen into the extreme fancy colours. Then it has its unique blue diamond, which is often beyond value.

The Cullinan.

The wonderful Cullinan diamond, found by my old friend, Fred Wells, was a stone beyond all calculation. Its crystallisation cannot be understood. A great, pure white, smooth-faced stone. When it was found it reflected its light so broadly and so brightly that Fred Wells thought it a great piece of glass or tin, but its strange brilliancy fascinated his imagination. He climbed a hill of ore to grasp its great wealth and, to use his own words, "it fairly staggered him with its immensity and its intense whitness." Strange things may happen, but this historic stone, gracing the diadem of earth's greatest Empire, may never be surpassed. True, its peculiar shape points to another half. This great stone in its size and weight confounded all men who had placed a limitation on the diamond's possibility. In diamonds the axiom is "the greater the mine the larger the stone," and time alone can show what wonders are yet to come.

Early Finds.

We were satisfied with our moderate stones in those early days. Yes, working hard, sometimes almost starving, toiling for weeks and weeks and finding nothing. Now, looking back, I see it all. We were inclined to think Rhodes, Rudd, Wallace, Robinson, the Inspectors, John Fry, Izdebsky and others hard, and we thought they forced the pace in trapping and in literally putting the knife in and cutting out the ulcers of the day; but, looking back, I can see my poor father's terrible disappointments explained. There were men who put boys on claims who were school Kafirs, Kafirs that could read and write. They always found big stones, and we suspected, but what could you do? *The stones were found in their claims.* These were only some of the things. Their game was to give big presents for other people's diamonds and find them in their master's claims.

The Easy Pioneers.

Well, the old diggers were a soft lot. In fact the old regime, whether a digger or a farmer, were soft, far too soft. Look at the great army of foreigners who have come into this country during the past fifty years or less. What did they bring with them and what is their position to-day? Has the farmer, the pioneer, wealth in comparison? Two per cent. of the population own fifty per cent. of the country's assets and command seventy-five per cent. of its internal trade! The surest thing in life is the survival of the fittest. Education and co-operation will be the only weapons that can help the son of the soil to hold his own against the skilled brains of Europeans. Education to frame protecting laws and co-operation to protect his markets. The old diggers slept on the wealth of a coming day, dreaming of diamonds that were never found. De Beers, in the sunlight of its early days, did not dream of its greatness. It never dreamt of its name becoming the great mark of world-wide fame, and if the ignorance of its future were so, did old De Beer himself ever foresee how honoured he would remain on the roll of Time?

Memorable Events.

There are still men living who remember events from those days. The first athletic sports held at De Beers, before Kimberley was known, taped some of the fastest men —Henry Nourse, Billy Ling, Edmund Ling, Oliver Back, Alfred Back, Matabele Thompson, Hayward, and one or two others. Garret Doyle at the hurdles, Tom Byrne at the long jump. These were all names I remember.

A "Character."

Thomas Shields, of Australian Gully fame, was a Scotchman, who had spent his early life in Australia. He and a Swede called Anderson together worked their claims until floating reef water compelled them to await better means of combating their difficulties. In the meantime they sold water and made a good deal of money with their water-carts. When the rotary machine started they washed debris. One day Shields jumped my hole. On a debris heap we had a set-to with long-handled shovels, and I ejected him. He never forgave me. At least I always thought he had not, but we were very great friends. He left all his money to Charlie Anshell. It was a weird proceeding. First of all, Shields, who was a director of De Beers, went to London with a million of money at least. Edmund Slatter introduced him to Tallerman and Anshell. Shields was a terrific dealer in De Beers and charters. After many years of speculative anxiety, he had about £500,000 left. I saw him prior to his death. He told me he had a contract with a hotel company at Brighton, which read like this. They gave him rooms on the eighth storey. He came to town regularly and lunched free at their London hotel. If he went to Edinburgh he stayed at their hotel there. Then he had a season railway ticket, and as he never took a cab his only outlay was a newspaper. Shields never drank or smoked, so his economy was complete. He never slept in a bed that was not set north and south by compass. He had two sisters in Scotland, and before his death he offered to leave his wealth to them, which they refused. All they would accept was a modest cottage and sufficient to live on. Then the disposal of the rest of his wealth troubled him severely. Thinking things over, he came to the conclusion that the secretary of De Beers had always been very kind and courteous (he had, dear old Tim), so he left him £25,000. Following this, he thought of his brokers, £25,000 to one partner, £25,000 to a second partner, and then the poor old soul got tired and left the balance to Charlie Anshell, the remaining partner; but I believe he remembered his lawyer for £10,000, and a better lawyer never lived, and he deserved it as much as any of the beneficiaries. I must relate that after Shields died, Charles Anshell got some £400,000. Then Anshell became ill and, before he died, consulted me in the disposal of his wealth. He left £25,000 to each of his partners, £10,000 to J. C. Rimer and Charles Phillips at the Cape, but all upon condition that they should outlive his son. Tallerman died first, Mankiewiez died next, and then, whilst tobogganning in Switzerland, the lad broke his back and died, when the balance of this huge fortune went to King Edward's Hospital. Shields had a great aversion to charities, otherwise I dare say he would have framed a different will, but he did good to at least two good men, and so did Charlie Anshell.

I will tell of De Beers in the days that followed, before the great company was formed, and picture men who were actors in the drama of its early life.

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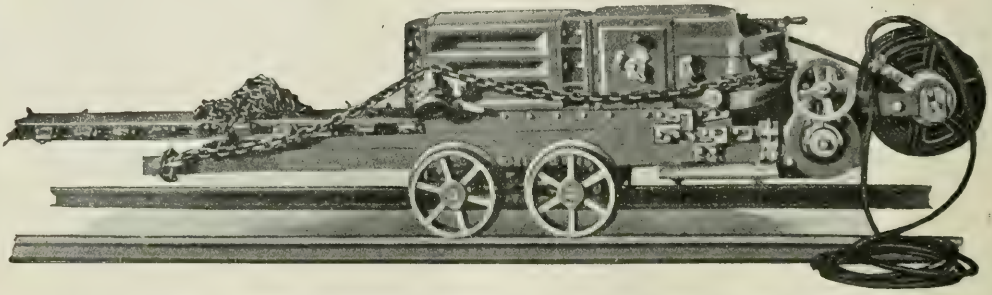

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The Old Golden Valley Mine to be Revived.

POSSIBILITIES OF A FORGOTTEN, KLEIN LETABA, PRODUCER EXAMINED.

From a report by Mr. Scott Alexander made to Mr. H. J. Ford, the owner of the property, we take the following extracts on the possibilities of the almost forgotten property known as the Golden Valley, in the Klein Letaba:

Mr. Scott Alexander writes, *inter alia*:—Agreeable to your request, I spent several (14) days inspecting your property, known as the "Golden Valley Mine," principally from a geological point of view, and also to give you my candid opinion as to whether or not the prospecting which you have accomplished at great cost during the last five years warrants you now placing it before the public as a proposition which will appeal to it and also warrant it subscribing adequate working capital to continue where you left off and develop the same into a vast payable mine with values, as you have amply proved, equal to, and beyond, any yet disclosed in this country.

Situation of the Property.

The property is situated in the Pietersburg district, No. 1 section, Klein Letaba, Northern Transvaal. It lies about 80 miles north-east of the town of Pietersburg. Mokeetsi Siding, on the Delagoa Bay branch line, is the nearest railway station. From Mokeetsi the property is just 35 miles north-east on a good motor road. One may leave Johannesburg at 8 p.m. and be on the property by 5 p.m. on the following day.

Topography.

The country in your area consists of a series of parallel ranges of rugged hills, from 500 feet to 1,000 feet in height, with a fairly level country between. The whole is covered with grass, bush and tall spreading evergreen trees, presenting the most lovely park-like appearance at every turn; not forgetting the abundant flora and fauna which such portions of semi-tropical Africa are blessed when a little off the beaten track of civilised man.

Climate.

It is generally thought that any country below the Berg beyond Pietersburg is unhealthy, and that one cannot live there for any time without contracting fever, and looking miserable, etc.

Dr. Montgomery, who has had many years' experience of this district, tells me that with ordinary precautions this property is absolutely healthy. The conditions are much the same as at Messina, where Dr. Montgomery was Medical Officer, and where malaria has been abolished for the last seven years. The white frosts here, he says, will kill the mosquito and make the place even more easy to keep healthy. Wherever one moves to in this world one has to accommodate oneself to environment, and therein lies the secret of health.

Geology, etc.

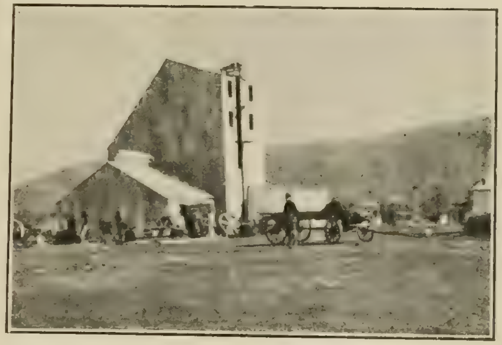
It may be taken for granted that each range of hills, as before mentioned, has a backbone of granite with schists, quartzites, slates, shales, etc., on its flanks, which extend across the valleys in either direction, in their natural sequence of bedding, which never varies all the world over. As the same is covered, for the most part, with alluvium and surface soil, prospecting is rendered difficult and expensive for those unacquainted with nature's pointers, which only long experience can reveal. In short, it is the auriferous "schistose age" of the earth's surface, in which are to be found quartz veins of all descriptions, from which, until the discovery of the low-grade but consistent bankets of the Witwatersrand, the world won its main supply of gold—as in America (North and South), Russia, China, etc. In South Africa the principal goldfields of this nature are Rhodesia, Klein Letaba, Murchison and Barberton districts. The three latter would have been in full swing to-day had it not been for the discovery of the Witwatersrand bankets, which have attracted all spare capital for the last 30 years. According to certain financiers the Rand has passed its zenith on account of the enormous capital required, and now unobtainable, to open up fresh mines on the same gigantic scale as has been the fashion of late years. Hence mining men of moderate capital are again turning their attention to the older and richer fields. I know of no better fields than the Klein Letaba, if good, honest, intelligent work is bestowed upon them, with sufficient working capital in all cases to cope with the so-called difficulties which confront the prospector and small mine owner as soon as his shafts reach water level. Water level, and beyond, is a company's goal, provided the gold is there, and this you have proved to be on your property without a shadow of a doubt, as will be explained later on.

Area and Formation.

The area of your holding is represented by 432 claims, each 150 feet by 400 feet, and varies from 2½ to 9 claims in depth, as per attached plan, and has a total length of nearly three miles. The trend of the formation is roughly from south-west to north-east, with a northerly dip, the whole being remarkably free from dykes of any kind, and faults below ground, you inform me, are not worth mentioning. The geological formation consists of talcose, micacious, hornblendic and chloritic schists, which forms the most kindly country for containing rich veins the world over. It is also easier for the miner to make footage in than the hard blue rock of the Rand.

Quartz Reefs.

The quartz reefs therein contained are of the "Lenticular bedded vein" order, perfectly continuous and varying from 9 inches in width to 3 feet 6 inches and over. They follow the sinuosity of the schists and dip in it at an angle of from 80 deg. to 90 deg., which, as all mining engineers are aware, lends itself to ideal mining in a 3 ft. 6 in. stope, with hand drills. The quartz is for the most part of a blueish white colour with little or no iron. The reefs carry their richest gold in the casing, which is closely attached to them on both foot and hanging walls, and in stoping parts freely from the country rock, thereby adding enormously to their milling value as a whole. The walls or slicken sides should be scraped to get the best results. Furthermore, the gold is free and with little or no silver. As is usual in a mine, each reef has its name. With you the North Reef, the one nearest the northern boundary, is known as the "Victory," and the South Reef, 540 feet away, the "Unity." This is important to bear in mind, as they will be alluded to presently by their respective names.



The Mill, Golden Valley Mine, Klein Letaba.

Prospecting.

Wherever the schists occur in this geological age, prospecting is always most difficult and expensive, as they weather more quickly than any of the surrounding rocks, and surface soil is found on them to the depth of many feet in most places, so that many useless trial shafts and cuttings have to be made by the average prospector before the reefs, or any particular reef, can be located. Once the pay reef is located he dare not, or should not, go very far afield to find its extension, as it may be missed by a few feet on either side; and another shaft has to be put down.

Cuttings are only made where the overburden is shallow, but even these are costly as the schists have to be blasted into for a certain depth to make sure that you are on the pay reef, for there are several in the same series which are unpayable as on the Rand, so that the prospecting pan must be in constant use, as the old hands know only too well. I can safely affirm from a rough addition of the footage in cuttings and shafts, from the first discovery of this property in 1892, that at least £25,000 has been expended, of which amount you inform me you have contributed, during the last five years, about £10,000, exclusive of machinery. The net result of all this work is that you have proved, practically from end to end of your property, two payable reefs, which placed end to end means six miles of reef. The deep shafts alluded to, at present under water, are conveniently situated in about the centre of the property, one behind the other on each reef, with houses, battery, etc., conveniently grouped about them. There is also another big house further away with native compound, etc. Witn all due deference to your persistent endeavour in this direction, I took the liberty of pointing out to you the fact that you have at least two other reefs of probably the same value yet to be unearthed, for the reason that, to my mind, the rich "Letaba Eclipse" Reef in the adjoining property on your eastern boundary, owned by a few well-known Rand men, cannot be correlated with either of yours, although it runs into and through your property. Nor can the very rich reef matter found at surface in your "Golden Hill" property some distance away on the western extension of the Golden Valley mine be correlated with them either—any more than can the rich white quartz found up the hill be the south of the Unity line, all being in the same schistose series, which covers fully a mile and a half in width. Fortunately the majority of your claims include the horizons of these undiscovered reefs, and it is to be hoped that any company to be formed will earmark a portion of its working capital for the necessary prospecting suggested.

Gold Values.

Combining, as you do, farming with mining, I conclude that the whole of your five years' occupation of this property has not been devoted entirely to prospecting and preparing the claims for flotation, but as you have shown me your records to prove that you have taken out, or rather crushed, 1,300 ounces of gold from time to time, from prospecting shafts only, it speaks volumes for the future of the reefs when actual mining is resorted to by a company that means business. The average value of this superficial rock could not have been less than two ounces per ton, plate recovery, as checked by running time of the battery and weight of stamps on quartz matter. To this may be added from ¼ oz. to ½ oz. in the tailings. Embodied in this report are a few assays taken by Dr. Montgomery, the Medical Officer in charge of this district, who might easily be taken for a Doctor of Geology from his intimate acquaintance with the rocks of the country. He has kindly consented to my publishing them, as he took them solely to satisfy himself that the extraordinary values in your mine, of which you had spoken to him from time to time, really existed. Therefore they may be taken without question, and fully bear out your statement to me that the Victory Reef, to which you have given most attention, probably because it is nearest to your house and battery, improved in value in depth, as his samples were taken from the bottoms of the shafts. Moreover, they prove the continuity of the gold on the line of reef, and that it is not always in chutes in quartz veins, as some geologists aver, but is far more evenly distributed in your reefs, as the distances from shaft to shaft sampled prove, and amply justify your courage in endeavouring to demonstrate that the pioneer shafts were not sunk on the only golden patches in a three mile stretch.

The following are Dr. Montgomery's assays, distances between shafts sampled, and their respective depths:—Sampling from east to west: No. 1 shaft: Depth 50 ft., width of reef 6 in. to 26 in. face of east drive; assay, 4 oz. 6 dwts. 12 grains; length of drive, 135 ft.; assay west face of drive, 4 oz. 16 dwts.; distance to next shaft west, 335 yards. No. 3 shaft: Depth, 48 ft., width of reef, 2 ft. and widening; assay value, 8 oz. 9 dwts. No. 4 shaft, 300 yards distant: Depth, 50 ft.; 2 stringers, 3 dwts. (since increased in value in depth). No. 6 shaft, 286 yards distant: Depth, 71 ft.; width of reef, 16 in.; assay value, 57 ozs. 6 dwts. No. 7 shaft, 190 yards distant: Depth, 68 ft.; length of drive, 64 ft.; width, 11 in. to 12½ in.; sample E., 6 ozs. 2 dwts. 12 grs.; sample W., 8 ozs. 19 dwts. No. 1: Mixed sample taken from various places along reef in No. 1 shaft, 13 ozs. 10 dwts. No. 8 shaft (no samples assayed), distant from above shaft 283 yards; width, 3 ft.; and pans 3 ozs. Distance sampled by me along Victory Reef, as above stated, 1,386 yards—(Signed) W. M. MONTGOMERY.

Attached to this report is bank certificate of Dr. Montgomery's assays as above. Also one to Mr. H. J. Ford from Unity shaft of 33 dwts. at 110 feet, over 3 ft. in width, as far as he has been able to get down the shaft.

Deep Shafts.

To speak of deep shafts of 140 feet and 180 feet—the first on the Unity, and the second on the Victory—may sound rather ridiculous to Rand mining engineers, but at 80 to 90 feet pumps are necessary to cope with strong water down to, say, 150 feet, when the formation becomes more compact and drier ground is encountered. But, as was the rule in the early days, and is not uncommon nowadays, mine managers failed to order pumps of sufficient capacity to lift it out of harm's way, with the result that the mine became

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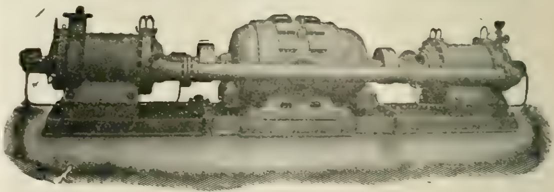

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flooded, and directors and owners grew tired of constant excuses and shut down, as there was no railway in those days and the mine was practically in the wilderness. Rather than shoulder the expense of sufficiently powerful pumps and other necessary accessories to repair old shafts, you followed a wiser course on which I have expatiated, having first dewatered them as far as possible to prove to your own satisfaction that values in both instances were there and improved in depth. The three or four hundredweight of rock you showed me, taken from the bottom of your No. 6 shaft just lately, would go more in ounces than I dare put down here lest my readers might think I was exaggerating. Suffice to say that it was "smothered in visible," as the prospector would remark when he wants to impress his hearers with something out of the common.

Surface Equipment.

Opposite the Victory shaft, and some 50 yards south, stands a fully equipped ten-stamp mill, 950 lb. stamps, Fraser & Chalmers make, with battery house covering it, engine room, fitter's shop, elevator, etc.—all in good order. The mill, pumps, mealie mill, lathe and all accessories are at present worked by a "National" 52 horse-power suction gas engine, with Corliss engine and 70 horse-power boiler in reserve, the whole being erected by Messrs. Fraser & Chalmers, of Johannesburg. Attached is a full inventory of everything in the way of machinery, etc., on the property, which you value at £9,000. As prices stand in Johannesburg to-day, with transport added, it could not be replaced for the same money. To this inventory I beg to draw my readers' attention, as it will enable them to realise that, given the necessary capital to develop the mine underground, everything is ready at surface to help make a speedy start and win gold from the development rock as fast as it comes along. This heading would not be complete without mentioning your up-to-date ideas of comfort in the way of conveniences and sanitary arrangements. Your house, kitchen, pantry, and the battery throughout, even to its third storey, are lighted by electricity, generated by an engine apart, or from the mill engine when running. There are hot and cold water to the house, and sanitary arrangements flushed into a septic tank some distance away. All windows, doors, verandahs, etc., are covered with insect-proof netting.

Water.

There is no scarcity of pure water for all purposes, as the Victory shaft produces 12,000 gallons per hour, and the Unity, distant 150 yards, 8,000 gallons per hour. A great feature of this healthy camp is the fact that there are no marshes nor stagnant pools about; all water has to be pumped from underground for battery and other purposes.

Fuel.

For the suction gas engine charcoal at 1s. per sack is always obtainable from the natives, and wood for boilers, when required, at 10s. a cord. "Mopani" wood is the most sought after by the Rand mines for props and timbering when obtainable, and this grows everywhere within easy distance of your property, so plentifully indeed that it is used for boiler fuel.

Labour.

As this and the surrounding district is the home-land of the native, wages range from 30s. to 40s. per month—the latter for hammer boys. As far as white men are concerned, if Dr. Montgomery, the Railway District Medical Officer, could be spared by the Government for a few days when your company is formed, to give his valuable advice as to the sanitary lay-out of the camp, there is no reason why it should not became a health resort for phthisis men (in the first stage) from the Johannesburg mines, whilst your mine is in the first stage of its development.

Food Supply.

Game is plentiful, while mealies grow in profusion, and to perfection, in these parts. Mealies never exceed 10s. per bag of 203 lbs. at any time.

Transport.

The road to the property is suitable for motor cars; it should be equally so for motor tractors, but up to the present mule, ox, and donkey wagon is the mode of transport from the station, 36 miles away.

Conclusion.

Most men will probably read only the headings "Gold Values" and "Reefs" and skip the rest; but with that you should be perfectly satisfied, for never of late days could they have seen such high, and average, values over so great a distance embodied in a report which asks for nothing better than confirmation thereof by personal inspection, which I am sure you are only too willing to grant to men who mean business. That I was surprised and more than satisfied with everything I have seen goes without saying, or I would have told you so from the beginning. That your property is worthy of £100,000 working capital to begin with any unbiased engineer should unhesitatingly state. For as the continuity and values of the reefs have been practically proved over the greater portion of the property, the suggestion at once strikes one that, later on, it should be cut up into one mile lengths, or three mines. The central mine could soon be brought to the producing stage and pay for the development of those east and west; to say nothing of the three extra reefs which, I am convinced, merely require intelligent prospecting to unearth. The "Letaba Eclipse" has already given the pointer for one of "4 ozs. to the ton," and the other two must come in due course.

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The Early Days of our Gold Fields.

A PIONEER'S RECOLLECTIONS.

III.

By Arthur Stenhouse.

What a contrast were the rugged kopjes and silent treeless valleys of the Transvaal to my previous home on Manitoba's boundless prairies, where, for a thousand miles the golden grain, interspersed with scarlet poppies, gladdened the heart of man. These rugged sentinels of the plain are undoubtedly fascinating, but the greatest attraction of the Transvaal is the wonderful climate and everlasting sunshine, and when we consider that the possible percentage of sunshine here is 73 per cent. compared with 30 per cent. in the British Isles, 52 per cent. in Italy, and 66 per cent. in Spain, it is not surprising that this country is peculiarly attractive.

In 1887, at Barberton, my old friend Rose Innes (now Magistrate of Pretoria) and I oftentimes wandered a twenty mile walk to the far-famed Sheba mine and inspected " Bray's " Golden Quarry. The reef was 22 feet wide, and averaged 3½ ounces of gold to a ton of ore. No wonder that the Sheba shares rapidly rose from £1 to £100!

Sometimes we wended our way up " Rimer's " Creek with its clear running streams and miniature waterfalls, and on the hill tops behind Barberton would gaze down upon Swaziland, a country rich in crops and cattle, and at that time ruled over by Umbadine, the despotic Swazi King; or glance across the valleys to the far-famed " Spitzkop," where many a pioneer found his last resting-place; and sometimes we tramped to " Moodies " and on the hill tops—in silence—watched the sun descend in all his glory.

1886 marked a tremendous boom on the Barberton Stock Exchange. Fortunes were made in a day. Champagne flowed like water, and we were all optimistic and happy in the exuberance of our verbosity. Percy Fitzpatrick, "Jock" Wight (bank manager), " Tommy " Purchas, E. H. A. Cohen, and a host of others, were amongst the early crowd In 1887 the Barberton Boom had burst. Speculators lost their quickly acquired fortunes, and with all speed departed by coach on their way to the new Eldorado, Johannesburg.

To-day (1921), pleasant are the memories of those pioneer days in the Barberton district and elsewhere; and we, the original pioneers, with all modesty justly claim the honour of laying the foundations of the greatest gold mining industry the world has ever known.

RAND WATER BOARD.

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The Board does not bind itself to accept the lowest or any tender

All Tenders are to be deposited at the Office of the Secretary, Rand Water Board, 2nd Floor, Central House, or P.O. Box 1703, Johannesburg, before **12 noon on Thursday, the 22nd December, 1921.**

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W. INGHAM,
M.Inst.C.E., M.I.Mech.E.,
Chief Engineer.

Johannesburg, 31st August, 1921.

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EDITORIAL.

THE STABILISATION OF THE CURRENCY.

A Real Solution at Last?

The Rand was startled last week by Mr. D. C. Greig's remarks, at a public meeting, in regard to the possibility of stabilising the price of gold for two years. We referred briefly to these remarks in our last issue, and in the meanwhile have endeavoured to ascertain how far Mr. Greig's hopes are likely to be fulfilled. Unfortunately, there does not seem to be much ground for believing that any practical proposal is afoot, though its possibility is freely granted. Silver, we all know, is usually sold forward, and, as a fact, generally enjoys two quotations, one forward and one " spot." Market considerations affected by the refining of the metal account for that peculiarity, but, in practice, it may be noted it is seldom sold more than two months forward. With gold, of course, the amount involved in the sale forward of the whole Rand output and for any lengthy period such as a year would involve such a tremendous sum of money that it would represent speculation on a scale so vast that it is unlikely that anyone could be found to attempt it. Moreover, the terms offered would, as an insurance premium, have to be so extraordinarily attractive to the undertakers of the risk that they would not allow of an adequate return to the producers. In fine, the transaction though, as we have said, possible, is not regarded by those mainly concerned as feasible. So much for Mr. Greig's scheme. While on the subject it should be said, however, that the community owes a debt to public men like Mr. Greig, who keep on, in season and out, insisting on the vital nature of the price of gold to the whole community. His latest proposal, as we have indicated, is merely one of uncommercial possibility, and cannot be described as affecting currency. To get at the root of the matter we must go deeper and consider gold in relation to currency and the great question of the day—the stabilisation of the latter.

Currency must be got back as soon as possible to a gold basis. Most thoughtful observers seem to be agreed upon this, but they read differently what is meant by " as soon as possible." Cables received from London the other day indicated that Professor Cassel, the great Swedish economist, speaking at the discussion on the proposals of the Finance Committee of the International Chambers of Commerce, declared roundly for an immediate return to the gold standard. The cables do not seem to have properly interpreted his remarks, neither do the necessarily abbreviated summaries of his speech appearing in the London mail papers do him justice. There is reason to believe that Prof. Cassel's suggestion was that there should be a return immediately *to the gold standard as measured in present values*. In this direction we are inclined to believe lies the solution of our present currency problem. Put briefly and somewhat bluntly, it means stabilising the value of gold in terms of paper by reducing the actual content of gold coins to their present paper equivalents. As a solution, of course, the suggestion is not new. But we find a growing number of earnest and thoughtful students of the question coming to favour it, and the more we study it the more it appeals as the choice of the lesser of two evils in the unravelling of the currency knot. We have not got the text of Prof. Cassel's proposal, but when available, due prominence will be given it in these columns. But we have certain other significant statements on the subject by authorities on the currency question which greatly strengthen the case. For instance, at the recent Crown Mines meeting Mr. Evans, in the course of his long and carefully reasoned speech, said: " The time cannot be far distant when the areas which constituted the old Austrian Empire and other countries whose paper currencies have become almost valueless will also *be obliged to abandon paper money for gold, no doubt with units containing far less gold than their pre-War money*." In his now famous paper on the gold and currency question read before the C.M. and M. Society last year, Mr. Evans made a similar suggestion, and he is clearly in agreement with Prof. Cassel on the point. If we remember aright, Sir Lionel Phillips mentioned the proposal at an early stage of the Gold Producers' proceedings in London, but its very revolutionary nature is such as to deter it from attracting much support at first blush. One waggish Professor of Economies is reported to have declared that Mr. Lloyd George would not dare to adopt the measure lest he should be classed by some future historian with those monarchs of England whom Macaulay had held up to obliquy for debasing the gold currency. But the Prime Minister has shown himself too apt a student of modern economics to be frightened by the bogey of any such historic parallel, and we believe that gradually the pressure of facts, the opinions of authorities such as we have quoted, and—most of all—the example of countries such as Germany, will drive home the necessity of action on the lines here indicated. That Germany is bound in self-preservation to adopt this expedient is generally believed by competent observers, and if Germany puts it into successful operation it can be demonstrated only too easily that the foreign trade predominance of that country must inevitably return to her. This aspect of the subject opens up such vast issues that we can merely mention it here in passing.

The gold mining industry, of course, stands to benefit most directly and most certainly from the proposal. Naturally that is an aspect which appeals to us most forcibly. The mere breath of a whisper that the gold premium could be stabilised—the mere echo of a rumour—last week was sufficient to send the Rand afluttering. That shows how the whole community is now alive to the fact of the vital importance of our obtaining such a price for our product as will keep the industry going at full strength. How much better than Mr. Greig's shadowy, uncommercial will-o'-the-wisp-like hope—for it is nothing more—that we should see the price of gold stabilised at to-day's paper values? It is plain to the meanest intelligence that the step would mean a measure of permanence for the Rand, a prolongation of the lives of the existing mines and a stimulus to the opening up of new ones. Indeed one has to exercise considerable restraint in picturing all the benefits, immediate and remote, that would flow from the adoption of the proposal of the Swedish professor. Suffice it that the whole community and the whole Union would reap immeasurable prosperity therefrom —and a prosperity legitimate, direct and secured upon the premier industry of the country. Against all this, we must bear in mind that the reform is still merely in the debating stage, that before it could become fact a vast amount of educational work has got to be accomplished, and what might be described as a vast amount of interested opposition overcome. But none of these things is insuperable. The proposal, we believe, has on balance, and when all is said, overwhelming merits, and we will be glad to open our columns to views on what is to-day at once a vital aspect of the gold mining industry and the greatest problem in currency and economics before the world!

THE DIAMOND OUTLOOK.

According to those best qualified to judge, there has been a material improvement in the diamond market in the past few days. It would seem that the world demand has already absorbed the vast quantities of stones thrown on the market by Russia and other Continental countries during and since the War. At any rate the cutters are said once again to be in the market for rough diamonds, and it is only a matter of time till their demands make an appreciable inroad on the large stocks of rough gems known to be held in reserve by the big producers. From Kimberley we hear that the outlook is regarded much more cheerfully, and it is confidently hoped that by the end of the year the situation will have taken a marked turn for the better. The improved outlook is best reflected in the firmer quotations for diamond shares, and the better price of De Beers Preference shares is a pointer of first-rate significance. Of course, we must guard against allowing our hopes to run away with the facts, and it may yet be a long day before the wheels of our great diamond industry begin to revolve at their former speed. But such as it is, the reassuring news from overseas must be welcomed as auguring well for the return of prosperity to an industry which plays so vital a part in the economic life of the country.

Notes & News.

An Oil Shale Invention.

An invention which promises to revolutionise the oil shale industry has been made on the Rand, and we hope to publish details as soon as the necessary patents have been secured. A trial run will be held this week of the process, which aims to reduce the capital expenditure on shale oil producing plant by means of first reducing the shale to powdered form. It is said that the capital expenditure involved in the production of oil from shale—which is the big stumbling block in the way of the industry can, if the new process prove successful, be reduced to a twentieth of the present figure. For the sake of our young oil shale industry we can only hope that the invention may turn out successful.

Newcastle Iron and Steel Debenture Issue.

A debenture issue to raise £50,000 more capital is announced by the Newcastle Iron and Steel Co., Ltd. The original estimates have been exceeded owing to the largely increased cost of labour and railage, and the new issue will provide ample funds to complete the work of construction and equipment. The excellent prospects of the venture have several times been described in our columns, and as the amount of ordinary capital issued is only £124,756, the debentures are well secured. Moreover, the rate of interest is placed at the attractive figure of 9 per cent., and the debentures are convertible up till September, 1923, into ordinary shares of the company and are otherwise repayable within from five to ten years. We noted recently that such an important firm as Messrs. Lewis & Marks had acquired an interest in this promising undertaking, and under the capable guidance of Mr. J. K. Eaton, its successful future seems assured.

* * * *

July Mineral Statistics.

The following abstract is taken from the statistics for the Union of South Africa dealing with silver, coal and base metal mines, issued by the Department of Mines and Industries:

	July.		Totals for 7 months from Jan. 1921	
	Output.	Value.	Output.	Value.
	ozs.		ozs.	
Silver...	72,667	£10,901	456,706	£69,680
	tons.		tons.	
Coal	962,333	420,830	6,655,907	3,012,171
Copper Ore & Concentrates .	—	—	61	2,825
Metallic Tin & Concentrates	56	5,243	944	94,463
Other Base Metals	—	9,566	—	88,044
Totals		£3,578,126		25,143,646

Advances on the June output are only to be seen in the case of silver, where an increase of 4,374 ounces valued at £657 is noted. Coal shows a falling off in sales amounting to 4,406 tons, metallic tin and concentrates 28 tons, and base metals a decreased value of £720.

* * * *

Lessons in Currency.

According to the *Times of India*, dated July 9th, the price of the sovereign has advanced to Rs. 20, that is 100 per cent. above the official rating of Rs. 10 to the sovereign! In this connection we may quote from "The Statist" of July 16th the following interesting comments:—"In a letter addressed to the Premier on the 12th instant by the Federation of British Industries, it is urged that the recommendations of the Cunliffe Committee need revision in the light of existing conditions, and that a Commission should be appointed to formulate a new currency policy for the Government. One would have thought that a body like the Federation of British Industries should have learned from experience the uselessness if not the harmfulness of Government committees on, and Government interference in, currency matters. Besides the Cunliffe Committee, we have had since the Armistice two other committees investigating similar problems—the Committee on Indian Currency and Exchange and the Committee on East African Currency. No one can justly determine how far Government action on the principles embodied in the Cunliffe Report was responsible for the trade depression, but the recommendations of the other two committees cited at any rate would now find few supporters. On the advice of the Indian Committee the Government of India made a futile endeavour to maintain the rupee at 2s. (gold), involving a useless sacrifice of something like 35 crores of rupees, while the maintenance of the East African currency unit at 2s., a measure taken on the recommendation of the East African Committee, is mainly responsible for the present deplorable condition of British East Africa."

Pilgrims Rest Mining Prospects.

From all accounts there is considerable activity at present on many of the outlying mines in the Pilgrims Rest district, says the local paper. Down "London" way the Hepta Syndicate are still doing remarkably well; while further afield Mr. G. Lines has struck something good; and similar good reports come from other mines. We learn that the Mali-Dyke Mine is re-starting mining operations, and the mills of The Rest Mine are expected to re-start crushing within a few months. Equally good reports reach us from the mines round Sabie, where development on a large scale is shortly expected.

* * * *

The Minister of Mines and the Far East Rand.

The efforts being made by Mr. W. E, Bleloch to secure an inquiry into the Far East Rand geological controversy, as recommended by Mr. Mabson in his articles in the *Stock Exchange Gazette*, were not furthered by the incorrect insertion of a negative in Mr. Bleloch's letter quoted in our last issue. In a letter dated May 2, 1921, addressed by Mr W. E. Bleloch to the Secretary of Mines, the following occurs:—

SIR,—This is to place on record that at the interview between the Rt. Hon. the Minister of Mines and Industries at Parliament House, Capetown, on April 20 (1921), at which you were present, the Minister, after hearing my account of the discoveries and facts and the errors of the geological survey, made manifest during the past eight years of work, said that he could see that it was necessary, in the public interest, to hold an inquiry into the question of the reefs of the Far East Rand . . . I agreed with the Rt. Hon. Minister, who said he would consider in what way inquiry should be instituted.

In a letter to Mr. Bleloch, dated May 6, 1921, the Under-Secretary for Mines and Industries (Johannesburg) wrote:—

SIR,—I am directed by the Rt. Hon. the Minister for Mines and Industries to inform you that, after careful consideration, he has come to the conclusion that no good purpose would be served by the appointment of a committee to inquire into the geological controversy.

* * * *

Rhodesia Broken Hill.

Speaking at the Rhodesia Broken Hill meeting, Mr. Edmund Davis said, *inter alia*: During the year under review we have carried out investigations on all known processes dealing with the treatment of zinc ores, and at present have at work an experimental plant producing about 50 lb. of electrolytic zinc per day. It will therefore become necessary at a later date to go into the commercial side and ascertain whether it will be possible to produce zinc on a far larger scale on a profitable basis. In referring to our profit and loss account mention has been made of receipts under vanadium ores. Most of the zinc and lead ores contain a very small percentage of vanadium oxide, but there are also tonnages of richer vanadium ore. Prospecting operations have so far disclosed about 3,750 tons of 7 per cent. to 13 per cent. vanadium oxide and about 6,000 tons of 3½ per cent. For some time past we have carried out experiments with a view to concentrating all ores below 10 per cent., so as to produce a product which could be profitably marketed.

* * * *

Stienies Diamonds.

The following is a summary of a report on Stienies Diamonds Syndicate, Ltd., by Mr. Minett Frames:—The famous Kimberlite fissure on "Retreat," about 6 miles north-west of Theron Siding, O.F.S., occurs in an area in which there are many known fissures and some "blows" of Kimberlite, which in most cases contain diamonds of very good quality. The diamond content of the different fissures varies in quantity, quality and size, but those of the Retreat fissure prove to be of a better commercial quality than the average from this Kimberlite province. The Retreat fissure stones are identical with certain Vaal River stones, and the writer attributes the source of the latter and possibly also the alluvial stones of Blydschap to the Retreat fissure. The Retreat Kimberlite fissure has been traced for a distance of over 4,000 feet in a north by west south by east direction. It has been stoped for nearly the whole distance to depths varying to 50 feet. Its average width at 30 feet depth is 9 to 12 inches, at 40 feet about 3 feet, and at one place 55 feet in depth was 5 feet thick. It tends to increase in thickness in depth as well as in a western direction. The fissure is of post-Karroo dolerite age, and two dolerite dikes lying across its path on its western extension have caused the Kimberlite fissure to split up in a manner discordant to the general strike. In certain shafts the fissure trends in a northerly direction, and it appears that the Kimberlite has been drawn from a central source or pipe. The writer affirms that if the fissure is traced a pipe will be disclosed in the future. The following latest report of the manager is of interest: 25 loads washed on 24th inst. yielded 5 carats, largest stone 2½ carats and of excellent quality, and further 25 loads washed 25th inst. yielded 5¼ carats, largest stone 1¼ carats. On 30th inst. 19 loads washed yielded 3¾ carats, largest stone 1 carat, also of excellent quality. In the past £8,000 worth of diamonds have been recovered from the workings. The largest stone found weighed 36 carats, several others of 7 and 20 carats were recovered. A quite unusual feature of the fissure is the small quantity of "fine sand" diamonds present.

* * * *

Ventilation on the Mines.

It is understood that the Joint Committee of Government and Chamber of Mines officials that has been at work on the ventilation question has made a preliminary report, and that its terms are very drastic as regards the improved artificial ventilation of the mines. We printed the other day the very outspoken remarks contained in the interim report of the Miners' Phthisis Commission on the subject, and it would seem that the Ventilation Committee has taken its cue from that report, and will insist on sweeping reforms in the direction of the better ventilation of the mines.

* * * *

The Prime Minister's Return.

General Smuts has had a fittingly cordial welcome back to his country this week, and, though he does not seem to have raised the expected millions, his presence alone has brought a restoration of confidence in business and industrial circles. Almost his first speech at Capetown dwelt on the importance of encouraging industrial development, and he has shown himself alive to the fact that the country's chief trouble at the moment is economic. Sir Lionel Phillips returned on the same ship as the Prime Minister, and we may hope that the event is a good augury for a better and more sympathetic treatment of the mining industries of the country at the hands of the Government.

Concerning Mines and Men.

Sir Lionel Phillips, Bart., returned on the "Kenilworth Castle" this week.

* * * *

A monument erected to the memory of the late Dr. D. Macaulay and the old boys of the Malvern Central Government School, Johannesburg, who fell in the Great War was unveiled at the school on Saturday afternoon by Mr. Patrick Duncan, C.M.G., M.L.A., Minister of the Interior and of Education. The funeral was attended by many prominent mining men in the district in memory of all that the late Dr. Macaulay had done to fight miners' phthisis on the Rand

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The Geology of Heidelberg.—III.

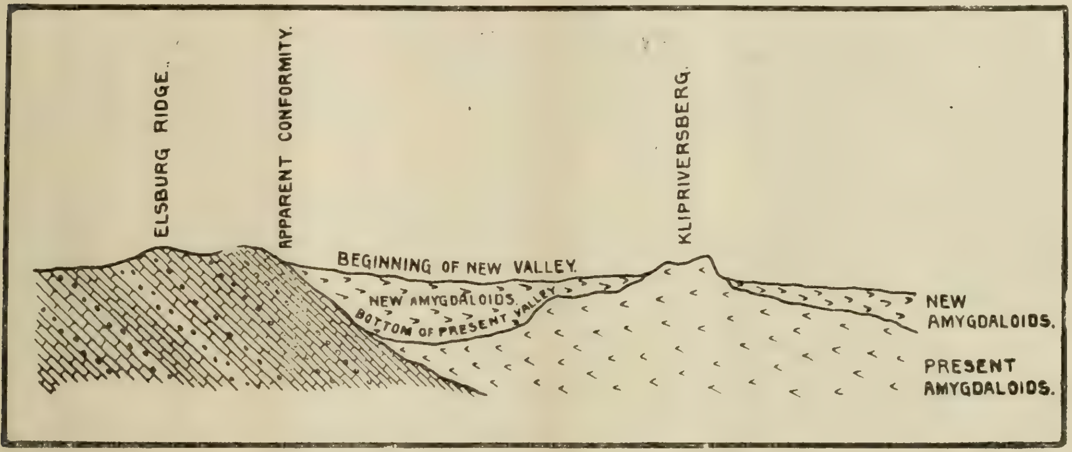
MR. BLELOCH'S REPLY TO DR. ROGERS.

Tectonic and other Considerations.

I would point out that if Dr. Rogers is correct in identifying the uppermost Witwatersrand beds exposed at Heidelberg with the Elsburg beds it must follow that these uppermost beds at Heidelberg suffered no erosion at all, for I understand him to say that without a break in the succession they were continuously and conformably succeeded by the Ventersdorp beds. That being so they must have remained under water during the whole period which elapsed while the Witwatersrand System on the Rand 30 miles away was being raised into a great anticline, and then eroded down to about its present surface. I would submit that under these continuous under-water conditions one would expect the beds to be much thicker at Heidelberg than on the Rand. Yet Dr. Rogers says they are thinner.

I submit, too, that this supposed continuous under-water condition in the Heidelberg area is in conflict with the established shallowness of the Far East Rand-Nigel-Heidelberg area of the Witwatersrand basin—a shallowness admitted by Dr. Mellor. At Heidelberg the average angle of dip of the Witwatersrand beds is low, about 12 to 15 degrees, and I submit that the lower the angle of dip of the beds of the system in a shallow syncline part of its basin the greater must have been the erosion of the upper beds of the system in that part. I submit that in fact in such a shallow synclinal area it would be impossible for the upper beds to survive and that only where there is a sharp anticlinal fold and a steep dip into the accompanying synclinal area, as along the Rand, is it possible for all the beds of a great system like the Witwatersrand System, 24,000 feet thick, to have been preserved.

Again, if, as Dr. Rogers and Dr. Mellor say, there was on the Rand an overlap both of the Elsburg beds and of the Ventersdorp over the eroded surface of the anticlinally folded lower Witwatersrand beds there, the overlap must have taken place subsequent to the upheaval and erosion of the anticlinal area, and the question arises why should such an overlap occur only over the most unlikely area for such an overlap; that is over the eroded Rand Anticline, and nowhere else. Why is there no evidence of such overlapping of the Elsburg beds over the Lower Witwatersrand beds, in the Far East Rand-Nigel Heidelberg area, or anywhere else? In the Heidelberg area Dr. Rogers implies that under water conditions continued, conditions far more favourable for such overlapping to occur than on the Rand where, as Dr. Mellor says, the land was gradually encroaching on the sea.



Geikie's Definition of Overlap.

On page 481, Text Book of Geology, Geikie says:—"Sediments laid down in a subsiding region wherein the area of deposit is gradually increased spreads over a progressively augmenting surface. Under such circumstances the later portions of a formation or series of sedimentary accumulations will extend beyond the limits of the older parts. This relation is called overlap, in which the higher or newer members are said to 'overlap' the older. . . It brings before us the shore line of ancient lands surfaces and shows how as these sank under water the gravels, sands and silts gradually advanced and covered them."

The conditions Dr. Mellor suggests to have been those of the Rand anticlinal area I submit are exactly the opposite to these required for overlap as laid down by Giekie in the passage quoted Dr. Mellor says:—*Geology of the Witwatersrand System*, page 33:

"The inference is sometimes drawn that the sea in this region must therefore have been encroaching on a receding land. The gradually increasing coarseness of the sediments . . . points to an opposite conclusion. It seems highly probable that during the deposition of the Witwatersrand System there was a gradual encroachment of the land, from the north or north-west, on the sea, and that though the locality corresponding to the present Witwatersrand and the area of the south of it were during the deposition of the upper Witwatersrand beds intermittently subsiding, an area not far distant was undergoing a corresponding degree of elevation. The evidence of the probable denudation of certain of the lower Witwatersrand beds in the later stages of the history of the formation, of the overlap of the upper division of the system on the lower, of the progressively increasing coarseness in general character of the Witwatersrand sediments, all point to this conclusion."

I would remark on this passage that overlap as defined by Geikie denotes not denudation, but spreading beyond the limits of, and covering over lower beds of the same formation. In regard to the greater part of the passage quoted I find myself in agreement with Dr. Mellor. I, too, think that there was an uprising of the beds into a land surface on the Rand—the eroded anticline proves this. I, too, think that there was a gradual encroachment of the land on the sea during the deposition of the uppermost Witwatersrand beds, and I think that these upper beds—the Elsburg beds especially—show distinct evidence of having been laid down by shallow turbulent waters and of being more of the nature of shore or sub-shore deposits than the evenly distributed and extraordinarily persistent pebble beds lower in the system like the Van Ryn, the Nigel, and the Government Reefs, which I consider to have been laid down by swift flowing currents over the floors of a wide but shallow sea or great estuary.

Encroaching Land Surface.

Dr. Mellor, therefore, is, in my opinion, correct in regard to the encroaching land surface on the Rand, and in regard to the conditions during the closing stages of the deposition of the Rand Beds, but his conclusion regarding an overlap of the upper division of the system on to the lower, puzzles me; and I submit that it is not borne out even by his own reconstruction of events as above quoted. I cannot see how there could be an overlap under prevailing conditions of an encroaching land surface. Nor do I think there is any reason or necessity for conceiving such an overlap of the Elsburg series. I would point out that only at one point, that on the Central Rand at Langerman's Kop, is it alleged by Dr. Mellor's school that this overlapping of the Elsburg occurs and nowhere else throughout the entire area of the Witwatersrand system where exposed in the Transvaal and Northern Orange Free State. Will Dr. Rogers and Dr. Mellor persist in breaking up with their far-fetched theory of "unconformable overlap" the established conformity of the beds of a great geological system merely in order to maintain a doubtful correlation, I would say at once the erroneous correlation of the Langerman's Kop beds with the Elsburg beds? Such persistence would, I admit, be very much in keeping with their assurance in advising the sending of dogmatic geological cables which condemned great mining enterprises, on which the welfare of this community and South Africa greatly depend, and all to maintain their correlation, which I submit is erroneous, of the unpayable Molyneux Reef with the "Main Reef Leader."

Conflicting Opinions of Dr. Mellor.

In order to endeavour to shake the blind faith of those to whom the words of Dr. Mellor and Dr. Rogers seem to be law, I will recall in passing that Dr. Mellor has at one time or other made the following conflicting statements of opinion about the Rietfontein and Langerman's Kop beds. Dr. Mellor has said:—

"(a) It may be noted that many points of similarity (of the Rietfontein Reefs) with the Langerman's Kop beds have been pointed out by several geologists, and this is a matter upon which even these holding the most diverse views as to the geological position of the beds are agreed."

"(b) Their disposition apparently in conformity with the Lower Witwatersrand beds certainly suggests an intimate relationship between the two."

"(c) The Reitfontein Series is found to lie outside the Witwatersrand formation.

"(d) With regard to the relationships of the Reitfontein Series and Langerman's Kop the author is in agreement with the opinion already held by many geologists that these belong to a formation unconformable to the Witwatersrand System."

Trans. Geo. Society of S.A., 1911, Vol. XLV., pages 38 and 39:

"(e) The reefs exploited at Reitfontein most probably belong to the Main Reef Group.

"(f) That ' the South Reitfontein Series are much more like the Kimberley Reefs in type, and in the writer's opinion belong to that group of reefs.' (*A. and F. Geology of the Witwatersrand*, 1917, Dr. Mellor pages 22 and 35.)

I will assume that Dr. Mellor had some evidence for these several mutually destructive opinions at the several times when he formed them. The statement that the Reitfontein beds belong to the Main Reef Series and the Kimberley Series of the Central Rand is in my opinion wrong, but if Dr. Mellor says that the Reitfontein pay reefs are the same as the pay reefs of the Far East Rand, that is, the Van Ryn Reef, and that the South Reitfontein reefs are the same as his Far East Rand Kimberley Reefs, which is what he does say, in effect, seeing he calls Van Ryn Reef the Main Reef Leader, then I, too, agree with him, for that is what I say myself, and many other are in agreement. But then, if Langerman's Kop is Reitfontein and Reitfontein is not Elsburg but the Far East Rand, Van Ryn and Kimberley, then Langerman's Kop—the only remaining *raison d'etre* of Dr. Mellor's and Dr. Rogers' unconformable overlap—could surely be withdrawn from the controversy and left in peace in its place among the Lower Witwatersrand beds. The old Kop, a near neighbour of mine, does not seem to have worried much about the attempt of Dr. Mellor to cast it bodily out of the Witwatersrand System.

Apparent Conformity of Ventersdorp Beds to Elsburg Beds.

There is, however, the apparent conformity, for considerable distances along the Rand area, of the Elsburg beds to the overlying Ventersdorp beds. It must be admitted that this question presents greater difficulties, but I believe it is to be explained by deductions from what I have stated above and from the opinions of Dr. Mellor himself which I have quoted in regard to the Elsburg beds and the conditions of their disposition during the closing stages of the deposition of the Witwatersrand System. I submit it to be possible that those portions of the uppermost beds of the system existing and outcropping at Elsburg to-day may never have been raised greatly, if at all, beyond their present relative positions even when the anticlinal folding occurred. I can conceive of their being that portion of the uppermost Witwatersrand beds which formed the foot of the steep slope of the Anticlinal fold. Their angle of dip is notably less than that of the Main Reef Series and the beds still lower than Main Reef in the system, which were nearer the heart of the anticline and the actual outcrop section of the Elsburg beds as we see them to-day may never have been raised above sea level during the great anticlinal period.

The Rand anticlinal fold, it must be remembered, was very sharp. Towards the end of the period of erosion of the Rand Anticlinal area it is possible, I submit, that the area to the south between Elsburg and Doornkop forming the southern base of the anticline may have been raised by accumulation of sediments, possibly assisted by minor earth movements, almost horizontally, to the level of the then surface of the eroded anticlinal area. Then it would only have required the return of another period of general subsidence to submerge the whole area once more and allow the returning waters and the supervening volcanic outbursts to spread the sediments, debris, and lava flows of the unconformable Ventersdorp beds over all, covering alike the uppermost Elsburg beds lying nearly horizontally and the eroded upturned edges of the lower beds of the Witwatersrand. Another minor anticlinal folding and consequent erosion would leave the area as we find it to-day, the Ventersdorp beds lying for considerable distances but by no means everywhere along the Rand in apparent conformity to the Elsburg, and always in obvious unconformity to the lower Witwatersrand. That is the probable sequence of geological events which I submit we can reconstruct.

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TUITION (Metal or Coal) by class, correspondence or privately.

The above passes are based on official returns; any claims based on number of entries are obviously unreliable.

Mining Institute (Prof. Yates),
St. James' Mansions, Eloff St.

A New Conformity!

In regard to the Rand Area I submit that if the present surface of the Rand, including the valley south of the Elsburg ridge and between it and the Klipriversberg diabase hills were once more submerged below sea level, and it were again subjected to similar conditions to those which occurred during the Ventersdorp period, and its upturned beds were again covered over with debris spread about by violent volcanic wave action, and with ejecta from great volcanic outbursts like those which produced the Ventersdorp beds, and that later it was raised again into land and subjected to ordinary erosive action, a stage would again be reached when the present ridges would reappear. The Hospital Hill ridge and Langerman's Kop would again emerge, and between them the Bezuidenhout Valley would again begin to be hollowed out into a new valley owing to the comparatively more rapid decomposition and erosion of the igneous rocks than that of Hospital Hill and Langerman's Kop beds.

The Elsburg ridge would likewise emerge and south of it another new valley would begin to take shape through this erosion of the new amydaloids of the new lava flow which would have filled up the present valley. The carving out of the new valley would expose the uppermost Elsburg beds which are now exposed, and at many places for considerable distances between Elsburg and Doornkop the new exposure of these beds would give the impression that they had been succeeded conformably by the deposits of debris and amydaloids of what I call the New Ventersdorp System yet to be. (See sketch of ideal section.)

Other learned doctors may then arise and say that these new beds are conformable to the upper, while unconformable to the lower. Witwatersrand beds, and industry destroying cables may be sent to the then Financial World Centre based on that very erroneous idea.

Ventersdorp Beds Unconformable at Heidelberg as everywhere else.

In regard to Heidelberg I submit that the apparent conformity at places in that district of the Ventersdorp beds to the Witwatersrand beds adjacent to them must, owing to the low angle of dip of the Witwatersrand beds there and the shallowness of that part of the basin have been brought about quite differently. There I submit that the beds of the Witwatersrand system were raised more into a table land retaining throughout a position much nearer the horizontal and without being folded into a steeply elevated anticline, I submit that during the vast period of denudation which removed the top of the Rand anticline—probably 10,000 to 15,000 feet of erosion or more—the uppermost beds of the system which had been raised bodily in the more horizontal position above described on the Far East Rand, and in the Heidelberg area were also removed by erosion, and that after the erosive action was completed there was a recurrence of subsidence below sea level, and the Ventersdorp beds were deposited on the topmost of the beds, whose position was sufficiently low in the system to allow them to escape the erosion which had swept away the Elsburg and the upper beds there, and that, later, further earth movements tilted the beds into their present position, causing the uppermost exposed beds to show apparent conformity in places to the Ventersdorp beds.

I will close my remarks on this subject with the following statement on the unconformability of the Ventersdorp beds in the Heidelberg district by the late Dr. J. T. Carrick. **Dr. Carrick states** in a signed report, on certain claims in Daspoort, dated August 6th, 1902, which I have in my possession: "Your property is overlaid by a sheet of amydaloidal diabase (Ventersdorp System) . . . which rests unconformably on the upturned edges of the Witwatersrand formation and almost entirely conceals all outcrops of the Main Reef Series . . . As the result of repeated careful examinations of the Heidelberg district I am satisfied that this diabase overflowed the country after the beds in the sedimentary formation had been tilted to a considerable angle." "The Bird Reef Series which outcrops on Wilgepoort . . . disappears abruptly on Daspoort, where it is covered unconformably by the diabase . . . The diabase therefore at this point abruptly overlaps the older formation in an unconformable manner. I could give other instances of the same class of evidence in regard to this point in the Heidelberg district, but I think the above is quite sufficient to illustrate the unconformability between the Witwatersrand formation and the Diabase."

Dr. Rogers after three years' study of the neighbourhood of Heidelberg, who, I have been informed, has spent much time examining the Wilgepoort area, although he has conspicuously omitted it from his map, has evidently not observed this Wilgepoort-Deepoort area referred to by Dr. Carrick, nor has he observed that conveniently placed example I have referred to, lying at his door, at the threshold of the Heidelberg Townland's gate, nor has he seen the other instance which caused Dr. Carrick as the result of repeated careful examinations to come to the same conclusions of the unconformability of the Ventersdorp beds in Heidelberg district, as Dr. Hatch, Dr. Corstorphine, Mr. Sawyer and I may say all geologists so far as I know who have written on this subject have came to, except himself and Dr. Mellor. Of course Dr. Rogers may say that all these conclusions are really assumptions, but on the other hand I would remind him of Charles Kingsley's saying: "The eye only sees that which it brings with it the power of seeing."

I find that Dr. Hatch includes among the Ventersdorp rocks acid and basic lavas, tuffs, breccias, and conglomerates (page 148, *Geology of the Transvaal*), but Dr. Rogers insultingly suggests that after examining a number of conglomerates, grits, quartzites, slates, acid andesites, norites, quartz dolerites and solvbergites, I regarded them all as amy-deeloidal diabase, in deference to Dr. Hatch's reputation as a petrographer, and he goes on with an affection of superiority to sneer at me for "blindly following a mistaken authority." That is—according to Dr. Rogers, Dr. Hatch is a mistaken authority! I will only make this comment, that Dr. Rogers' statement is incorrect and unfair to Dr. Hatch and that of the two doctors. Viewed as authorities on Rand geology, I find that Dr. Hatch is by far the more reliable.

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The Appalling Wastage of Coal.—III.

THE LOSS TO SOUTH AFRICA—LESSONS FROM OTHER COUNTRIES—NEED FOR CO-OPERATION BETWEEN COLLIERIES AND GOVERNMENT.

The utilization of waste coal in South Africa was recently dealt with by a technical correspondent, Mr. C. L. Harvey, in the columns of this Journal. He regards this alleged low heating values of South African coal as more apparent than real when the prospect of burning South African coal in pulverised form is considered, and asserts that there is no reason why the daily production of " waste " coal (if not the accumulations of past working) cannot be used if pulverised, and why, thus treated, the so-called low-heat-value coals of South Africa, now ruled out for locomotive firing, should not be rendered serviceable. Mr. Harvey goes on to say that when reading the mass of data collected on the subject, one is struck by the really consistent average heat values of the coal in South Africa, and especially by the normal small quantities of moisture contained in the coal in most instances. He regards the future of all coal-bearing countries as destined to be to a great extent governed by the possibility of using local fuel in place of imported coal at very high prices. That it is quite possible to eliminate a large quantity, if not the whole, of imported coal is now being realised in various parts. Brazil has already supplanted imported railway coal to some extent by fuel which hitherto has been considered useless, and continuous extensions in this direction are to be made. The coal used in Brazil is of lower quality than the South African fuels, as the following comparative analyses of Brazilian and South African coals clearly show:

	Brazilian Coal. as used "dry" in pulverised form for locomotive fuel. per cent.	Durban Per cent.	South African Coal. Undried. Kr'nst'd. Per cent.	Durban Per cent.
Moisture	7·90	1·6	8·29	0·84
Vol. Carbon	28·04	27·10	31·27	25·3
Fixed Carbon	34 73	60·05	45·32	68·94
Ash	29·33	11·25	15·12	5·76
Sulphur	3·16	1·51	1·43	1·53
B.T.U. per lb	8,820	12,950	11,020	14,722
Evap. power %	9·2	13·4	11·4	15·23

Busy Witbank—an Area of many Waste Dumps.

Some Points of Interest.

In connection with these analyses of coals, there are one or two points of outstanding interest. The Brazilian coal analysis represents the fuel in pulverized form after treatment in a rotary drier. The fuel is of friable nature, and the ash of such form that when subjected to heat it flows round the lumps of fuel on a hand-fired grate rendering it impossible to burn the coal. Kroonstad coal contains about the highest degree of moisture recorded, 8·29 per cent., whereas most South African coal contains but 1 or 2 per cent. of water, and for which drying plant would not be required. Many references have been made in the pages of the *South African Mining and Engineering Journal* to the friability of the fuel with consequent heavy loss in smalls and dust—a loss eliminated when coal is pulverised. In Italy a locomotive coaling plant is to be installed for dealing with the native lignite fuel; in Holland a similar plant to handle Limburg coal, in Sweden locomotives have been for some years run on pulverised peat and pulverised bituminous coal; in America colliery boilers are fired with straight pulverised anthracite tailings from the washery plants. There is naturally the desire in Continental countries to replace costly imported coal by local fuels, peat, lignite, brown coals, sub-bituminous coal, and other grades of fuel which are available In anthracite districts the present tendency is to make use of the duff and washery waste as reliable fuel for boiler firing. There appears, therefore, every opportunity to burn South African fuel, which is on the whole of far superior quality to the fuel now being successfully applied in other less fortunate countries. Not only would great economy in consumption (20-25 per cent.) and saving in money be achieved thereby, but conditions of firing locomotives, land boilers, marine coasting steamers, industrial plants, would be brought up to the level of oil-firing at but a fraction of the cost of the latter. Referring to the suggestion that coal in the raw state should not be burnt at all. Mr. Harvey expresses the view that, while the extraction of distillates and the recovery of by-products from coal are naturally matters of an engrossing nature, the evidence available at the moment does not hold out hope of profitable processes except under propitious conditions. The one point outstanding which confines workable plants within limits is size of installation. Up to a given capacity in coal treated per hour carbonisation processes do not pay, assuming normal market values for products. Whereas with workable plants as regards capacity, the gas produced (which is one of the assets of such a scheme) becomes so voluminous that it cannot be dealt with. Conditions existing in any one country or locality must therefore be such that a carbonisation process can be developed with advantage. This requirement does not enter into the question to anything like the same extent for pulverised coal applications, but there is a total loss of distillates and fertiliser materials. The application of pulverised fuel will, however, always show a saving of 20-25 per cent. over straight coal as hand-fired, and, moreover, any grade of coal can be used so that isolated installations of small capacity—say 30 or 40 tons per day—will show the same economy in the furnace as plants of 1,000 tons and upwards per day. This essential factor should be borne in mind when advancing schemes for sparsely-populated countries such as South Africa, where self-contained pulverised coal plants can be operated with every confidence in the results to be obtained.

Remarkable Photo taken at Delagoa Bay.

Recent Research.

Valuable light is thrown on the subject of coal wastage and how to turn our coal resources to the best advantage, by an interesting descriptive account received from England of the new experimental station opened lately by the Midlands Products Co. It may be recalled that this company was registered in 1918 to put into practical working the recommendations of the Committee of Petroleum Technologists. The opening of its experimental station will form an important development in the history of the coal and oil industries, and provide an organisation where coal and other bituminous material in Great Britain or from any other part of the world may be scientifically treated in order to ascertain by what method and in what manner such material can be turned to the best commercial account and where various systems and processes can be tried out. The fact that spirit and oils can be obtained from bituminous material by modern methods of treatment and the importance of such commodities throughout the world appealed at once to the chairman of the Anglo-Persian Oil Company, Ltd., with the result that its subsidiary, the British Petroleum Company, Ltd., acquired a substantial interest in the undertaking. The remainder of the capital was provided by certain of the largest concerns in the country engaged in coal-mining, the generation and distribution of electric power and the production of the various by-products. From this it will be realised that the mining company has been established for the purpose of solving the great problems concerned in the better utilisation of coal which is produced, the development of unworked deposits, the production of oils and spirit, the generation of power, and the many other questions and problems associated with these industries. In addition to tests of material from the British Isles that have already been made, excellent results have been obtained from samples of material from South Africa, Canada, Nigeria, Australia, America, India, Japan and many other parts of the world. It is pointed out that local conditions must in all cases be taken into consideration in carrying out a test. For instance, in South Africa—where coal is cheap and the price of oil is high, and where sulphate of ammonia is in large demand—it would appear that the proper course to adopt would be to take the cheap raw material and treat it for the production of the maximum amount of oil and sulphate of ammonia. But local conditions might suggest an entirely different process—a process which would produce less than the maximum yield of oil, but which would leave a solid residue either for burning under boilers, in the open grate, or for briquetting for domestic or industrial use, or a heavier briquette for transport. There must also be taken into consideration still another method of treatment, whereby the solid residues would be used for the provision of cheap electric power. From this it will be readily understood that in order to obtain the information required as to how any particular material can be turned to the best advantage, it became necessary to realise the different matters which must be taken into consideration so that material could be treated in retorts specially designed and constructed for particular purposes, and so that the one might run in competition with the other

Latest Labour Trouble.

MODDER "B" THE CENTRE.

A Prompt Settlement.

The Modder "B"—West Shaft Section—was the centre and beginning of the latest labour trouble, and, though settled, it may be well to record the facts as agreed on by both sides. It seems that failing a request by the management to resign or refund a sum of £180 paid out as a bonus to his section, a mine captain named Holman was dismissed. The Mine Workers' Union took up his case and was refused a board of reference regarding the matter between the Union and the management on the ground that the man in question was a mine official, and as such came under the Mine Officials Association. During last week-end the Executive of the Benoni branch of the S.A. Mine Workers' Union considered the position arising out of the refusal of the Chamber of Mines for a board of reference. The Executive decided to give the management of the Modder "B" twenty-four hours' notice of its intention to call the men on the west sinking shaft out on strike, while a ballot of the whole of the rest of the property will be at once proceeded with.

Where the Latest Labour Trouble Occurred.

The reply of the Chamber of Mines to the Miners' Union's letters is in the following terms:—

"With reference to your letter of yesterday's date, demanding a board of reference in the case of Mine-captain Holman, you are aware that the Chamber has repeatedly stated its position in this matter. In a letter of July 13, 1920, to the General Secretary, South African Industrial Federation, the following passage occurs:—

Subversive of Discipline.

" ' In the opinion of the Chamber it would be subversive of discipline on the mines, and prejudicial to efficiency, if the wages and conditions of employment of officials were to be determined by this Chamber in negotiation with unions the members of which consist mostly of daily-paid employees, who in their employment are the subordinates of those officials. The Chamber has in the past negotiated in regard to such matters with the Officials' Associations, and it appears to the Chamber to be a reasonable and natural arrangement that those negotiations should continue to be so conducted.'

"In a statement by the Chamber which appeared in the Press on March 17, 1921, this attitude was reaffirmed as follows:—' (3) As regards staff employees, for obvious reasons the industry cannot recognise the workmen's unions as representing or acting for the officials or staff on the mines in any respect. Separate officials' organisations, recognised by the Chamber, exist, by which these employees are represented.'

"For the reasons set out in the former extract, the Chamber cannot depart from its position on this point. Mine-captain Holman is in no way prejudiced thereby, as the Chamber is perfectly ready to discuss the case with the Underground Officials' Association, of which he is a member; and, in point of fact, the management of the Modder B has asked that a board of reference with that Association shall be called, which will be done as soon as arrangements can be made with the Association.

Strike Not Warranted.

"In view of the fact that the attitude of the Chamber in this matter has repeatedly been published and was officially communicated to the South African Industrial Federation upwards of a year ago, the Chamber considers that your Executive Committee's threat to call a strike over the matter is entirely unwarrantable."

This was signed by Mr. J. Boyd, assistant secretary of the Department of Labour of the Chamber of Mines.

Mr. E. S. Hendriks, acting general secretary of the S.A.M.W.U., drafted a reply to this letter, pointing out that the notice "that the question of officials' salaries and conditions of employment could not be discussed with workmen's unions" was never forwarded to the union for its consideration, and that the putting into operation of this notice was a distinct breach of the principle and spirit of collective bargaining. The agreement under which my Executive Committee demanded a board of reference was naturally the one existing between the Chamber and the S.A.M.W.U., and the letter added, "And we are, therefore, not prepared to submit Holman's case to a board of reference brought into force under an agreement existing between the Chamber and some other union or association. Further, this is a dispute between the Modder "B" Company and a member of their union, and we, as a union, do not feel justified in allowing a third party to enter into the dispute."

The letter concludes that the Benoni branch and the Executive have now without question complied with all existing agreements, while the Chamber has failed to comply with the Executive's wishes in regard to a board of reference. The matter was settled on Thursday by the re-instatement of the mine captain, Holman.

Transvaal and Natal Collieries.

At the adjourned annual general meeting of the Transvaal and Natal Collieries, Ltd., held on August 12, the Acting Chairman announced that Col. R. S. Williamson had accepted the appointment as chairman of the company, and the board had been reorganised and strengthened. An active policy of development of the company's Vryheid properties, which was interrupted, had been resumed, and the board expects to be in a position to place on the market coal of first-class quality within a few weeks. The board decided to close down Uitkyk mine and concentrate on the development of the company's valuable properties in Natal.

The Week in the Sharemarket.

GENERALLY BETTER—LONDON LEADS—EX-ENEMY SHARES—DIAMONDS BRIGHTER.

At the time of writing on Thursday the whole market is better and brighter, and the week's business promises to prove the best for some time. London has again become a buyer, and looks like supporting the market to higher levels. The explanation, as cabled during the week, is that "the recent buying of Kafirs was based solely on the theory that the ex-enemy share question had been solved, but no definite information can be ascertained. Paris has been one of the principal supporters of the upward movement, but later the market became quieter. Five-day bulls attempted to take profits. The market closed with a feeling of confidence that the strength of the market would be sustained. The technical position of the diamond market appears to favour further improvement. Rhodesians were brighter with inquiries for low-priced shares." The London *Daily Mail* states that German speculators have recommenced the purchase of the better class of Rand shares on the London Stock Exchange. The date for the registration of shares purchased is September 1st, the date of the official end of the war. A Standard Bank cable says: "The Stock Exchange has been very quiet owing to the holidays. Gilt-edged securities have fallen back with the tightening of money, but foreign bonds remained in good request. Home railways, which had been depressed by lower dividends, had a substantial rally as a result of railway decontrol. Industrial securities are still dull owing to many reports showing poorest results. Oils had a sensational slump owing to forced liquidation, but a partial rally has ensued. There has been a strong rally in foreign railways, especially Argentine Rails. Mining shares strengthened on the high price of gold and favourable labour developments on your side." Whether the Modder B trouble will affect buying on the other side remains to be seen, but the latest cables received on Thursday continued to reflect the better tone and feeling. Though there appears to be nothing in Mr. Greig's hope of a measure of stability for the gold premium, which excited the market last week, attention is turned to the increasing possibility of a radical change in the currency systems of the world whereby gold will be made to retain its present market value in terms of paper. This, of course, aims to reach Mr. Greig's goal by a far sounder and more scientific method, and is fraught with great possibilities for the future of our gold mines. We have all had the precarious character of the lives of most of our mines so emphasised of recent months that the mere suggestion of putting them out of danger is full of encouragement. It is expected that a statement will soon be made regarding the disposal of ex-enemy shares, which problem is said to have yielded, at last, to the tact of General Smuts. The diamond outlook, moreover, is brighter both as regards the market for the stones and the shares. Base metals are still moribund, but oils are a little more active. The general outlook at the moment is better than it has been for many moons, as the following quotations for the week will show:—

	Fri. 26th.	Sat. 27th.	Mon. 29th.	Tues. 30th.	Wed. 31st.	Thur. Sept. 1.
Anglo-Amer. Corp.	26 3	25 6	24 0	24 3	24 9	26 0*
Apex Mines	7 0*	—	—	7 0*	—	7 0*
Bantjes Cons.	5 9*	5 8*	5 6	5 6	5 6*	5 6*
Brakpan Mines	54 3	54 6	-	53 6	54 0*	56 0*
Brick and Potteries.	—	4 0†	—	—	—	—
Bushveld Tins	0 6*	0 6*	0 6*		—	0 6*
Con. Diamonds	18 9	18 0*	18 4½	18 3*	18 6*	19 4½
Cinderella Cons.	1 9*	1 9*	1 9*	—	1 9*	1 9*
City and Subs.	2 4*	2 6†	2 3*	2 3*	2 3*	2 6†
City Deeps	51 0*	50 0*	50 3*	50 0*	60 0*	51 0*
Clydesdale Colls.	—	—	27 0*	26 6*	-	26 6*
Con. Investments	—	—	—	—	26 3*	—
Con. Langlaagtes	17 0†	—	—	—	16 0†	—
Con. Main Reefs.	11 9	11 9	11 9*	11 6*	12 0†	12 5
Con. Mines Selection	18 0*	—	—	—	..	—
Coronation Colls.	40 0*	40 0*	—	—	40 0*	40 0*
Do. Freeholds	0 10*	0 10*	1 0*	1 0*	1 0*	1 3†
Do. Syndicates	6 6*	6 0*	6 0	6 0*	7 0	7 3
Crown Diamonds	3 9*	3 9*	3 9*	3 9*	3 9*	3 9*
Crown Mines	45 0*	45 0*	50 0†	44 0*	44 0*	44 6*
Dagga. Mines	3 2	3 2	3 2	3 1*	3 6*	3 2*
E.R. Coals	2 3†	2 0*	-	2 3†	2 3†	2 0*
E.R. Deeps	0 8*	0 8*	0 8*	0 8*	0 8*	0 8*
E.R. Props.	—	6 9	6 6	6 9*	6 7*	6 9a
E.R. Debentures	–	£67½*	—	£68*	£71*	£72*
Eastern Golds	0 7*	0 7*	—	0 7*	—	—
Ferreira Deeps	—	10 6*	—	–	—	—
Frank Smith Dmds.	4 3	4 3	4 3*	4 3*	4 4	4 5
Geduld Props.	51 0	50 6	49 4*	49 6	49 6*	49 9
Geldenhuis Deeps	—	—	—	6 0*	—	—
Glencoe Colls.	—	13 6*	14 0†	14 0†	14 0†	12 0†
Glynn's Lydenburgs	7 3*	—	7 0*	—	7 6*	7 6*
Govt .Areas	85 0	85 0	84 0*	84 0	84 0	85 0
Hume Pipes	15 0*	15 3	15 6†	15 0	16 0†	16 0†
Knighh tCentrals	4 9*	4 9	4 9*	4 8*	4 10	4 10*
Lace Props.	9 3	8 0*	8 6	—	—	—
Leeuwpoort Tins	10 6	10 3*	10 3*	10 6†	10 3*	11 0*
Luipaardsvlei Est.	2 1*	2 3*	2 6*	2 6*	2 6*	—
Lydenburg Farms	6 0*	—	5 9*	5 9*	5 10*	5 10*
Meyer and Charltons	18 9*	80 0*		78 9*	80 0*	80 0*
Middelvlei Est.	1 3*	–	1 3	—	—	—
Modder B.'s	30 9	30 6	29 6*	29 9	29 9	30 3
Modder Deeps	45 3	45 3	45 0	45 0	45 0	45 0
Modder Easts	10 10½	10 9	10 6	10 7*	10 6*	10 9
Modder Wests	1 6*	2 0*	2 0*	2 0*	2 0*	2 0*
Natal Navig. Colls.	33 6†	—	—	31 6*	–	32 0*
National Banks	220 0*	220 0*	220 0a	220 0*	220 0*	220 0
New Eland Diamonds	—	24 6*	-	25 0*	—	25 0*
New Era Cons.	7 9	7 6*	7 6*	7 6*	7 6*	7 6*
New Geduld Deeps	1 4*	1 4*	—	—	—	—
New Kleinfonteins	6 0*	—	—	6 0	6 0*	6 4*
New Modders	75 3	75 0	75 0	74 3*	75 0	75 9
New Unifieds	3 3*	3 6*	3 3*	3 9*	3 9*	—
New States	25 3*	25 3	25 0	—	24 6*	24 9*
Nigels	—	6 6	—	-	—	5 0*
Nourse Mines	10 6	10 3*	10 3*		10 3*	10 6
Premier Deferreds	—	100 0*	—	—	100 0*	—
Premier Preferreds	101 6*	—		—	—	—
Pretoria Cements	47 6*	47 3	47 0	46 6	46 6	44 0*
Princess Estates	1 0*	1 0*	1 0	1 0*	1 0*	1 0*
Rand Collieries	—	—		—	—	1 0†
Rand Neucleus	1 3	1 2*	1 3	1 2*	1 2*	1 2*
Rand Select. Corp.	57 6*	—	-	—	—	—
Rand Water Board	£90†	£90†	—	£85*	£86*	£87*
Randftn. Est.	19 0	18 9	17 9	18 0	18 7½	19 9
Roberts Victors	9 0	9 0*	9 0*	9 0*	9 6*	9 0*
Rooibergs	4 6†	3 6*		4 6†	-	4 3†
Ryan Nigels	3 6*	—			—	—
Randftn. Centrals	11 9*	11 9	11 9*	12 0	12 3*	13 0*
Rouxvilles.	2 0*	1 9*	2 0†	1 6*	1 6*	1 3*
S.A. Breweries	28 0*	28 0*	27 0*		27 0*	—
S.A. Lands	4 11	4 10*	4 8*	-	4 9*	4 6*
Springs Mines	45 6	44 6	43 6	44 0	44 10½	45 0
Sub-Nigels	11 0*	11 3*	11 3*	11 3*	11 3*	12 0
Swaziland Tins	10 0†	10 0†	10 0	—	10 0†	10 0†
South Van Ryns	2 11	2 10*	2 10*	2 10*	2 10*	2 10*
S.A. Townships	11 3*	11 3	11 6	11 3*	11 0*	11 3*
S.A. Alkali	17 3*	17 3*	17 0*	17 0*	17 0	16 10½
Transvaal Lands	—	18 0†	-	-		—
Theron Diamonds	12 0*				10 0*	
Trans. G.M .Est.	-	9 0*		-	—	9 0*
Transvaal Silvers	24 6	23 6*	24 9†	23 6	24 0*	23 9
Union 5 per cent.	£99¾*	£100		£99½*	£99½*	£99½
Union Corporations	15 0*	-	-	—	15 0*	—
Van Ryn Deeps	74 0*	74 6*	72 6*	74 0*	74 9	74 3
Van Ryn Estates.	—	—		—	11 0*	—
Village Deeps	9 9	10 0		9 3*	—	10 0
Van Dyks	1 3*	1 0*	1 3*	1 3*	1 3*	.
West Springs	14 1½	13 9	13 0	13 3*	13 3*	13 9*
West Rand Cons.	2 0*	—	—	—	—	—
Western Rand Est.	4 0*	4 1*	4 2*	4 0*	4 2*	4 3
Witwatersrands	—	—	—	—	10 6*	—
Wit. Deeps	7 6	7 9	7 6*	8 3	8 6	8 6
Wolhuters	4 3	4 3*	4 1*	4 3*	4 3*	4 3*
Zaaiplaats Tins	3 0	3 1*	3 0*	3 0*	3 0*	3 0*

* Buyers. † Sellers. a. Odd lots. b. Ex London.

ANSWERS TO CORRESPONDENTS.

J. M. M. (Benoni).—Libellous.

"Ajax" (P.E.).—(1) 10 per cent.; (2) too soon to say, but should be at least 12½ per cent.

M. S.—The annual meeting will be held in December.

Letters to the Editor.

THE FAR EAST RAND.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—The prolonged geological discussions being carried on by Mr. Rogers, supported by Mr. Mellor (on behalf of the Government held mining areas), and Mr. Bleloch and others (on behalf of the adjoining mining ground non-Government areas) is surely beside the mark.

Do or do not the payable reefs existing under the Government held ground which pay a heavy tribute to the Government extend beyond their (accidental) boundary into ground which would not have to pay the same heavy tribute to the Government? If they do not, then surely any geological discussion would be confined to the whys and wherefores of so remarkable a phenomenon unparalleled in the history of geology, if only in its illustration of the partiality of Providence for big battalions of money?

If Mr. Bleloch cr anyone else should get the public effectually interested in destroying this myth (if it is a myth), bringing into the market an area in competition with the Government area ground, it would knock Providence into a cocked hat and the bottom out of the value of the Government held areas not yet leased. The obvious inference is that so long as it suits Big Finance and its commitments, the public can be fooled by hair-splitting geological arguments. But whether they can or can not really makes no difference. The people of South Africa have again and again determined to surrender their rights and their intelligence to a financial hierarchy, from the clutches of which no Government has yet been able to escape. The people prefer to be thus governed. It is so much less trouble. It saves the pain of thinking—though little incidents such as these serve their purpose in enabling us to realise the price we do pay for this surrender. One could adduce numerous other incidents of a similar character, but we must go "gahle" and be content to realise the fact that we are losing the right to exploit what looks like the biggest and richest goldfield in the world at a moment when it possesses a rare value to the world. This should prove quite a useful object lesson. Yours, etc.,

COMMONSENSE.

MODDER EAST.

A Shareholder's Suggestions.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—Allow me to suggest a simple way how to get the Modder East company out of the doldrums she has been in since the postponement of the erection of the big plant. What is wanted is to attract the sympathy of the shareholders and the public in general to the company which has been in disfavour of late, as is evidenced by the phenomenal fall in its shares and the failure of the shareholders, in consequence, to make the financing of the company a success. The greatest bugbear of the average shareholder is a too big capital. On the Far East Rand one and a half million has been the limit. Mines, with tremendous areas, like States (Old and New), Brakpan and West Springs, have not passed the limit of 1½ million. Of course there were reasons for the extraordinary high cost of development and equipment in War time, when wages and stores were more than double, so that no blame can be attached to the management or, at least, not all the blame.

To overcome this obstacle, and finding means to put up the portion of the large plant acquired from the Simmer Deep, the following scheme could be adopted:—

Reduce the capital of £1,215,624 now issued to £810,416 by exchanging two new shares for three old ones; then increase the capital to £1,500,000.

To provide funds for the erection of the reduction plant, every shareholder of four present shares should be given the right to take up one share at, say, 25s. preferable, with a guarantee of the controlling house, for some consideration, if obtainable. This will give £379,882.5, which is enough to erect a reduction plant and equip the mine underground for dealing with the bigger tonnage. The debenture holders, having an option on 400,000 shares at par, may agree to shift their option to 266,666 shares at £1 10s., or it can be redeemed out of the profits of the mine, and the shares offered at 30s., a course which in ordinary circumstances will not be required. The balance of shares, 119,168, can be held in reserve for a later date for the exploration of Rand Klips area, and, if possible, come to amicable arrangements with the owners of the south-eastern extension of the Cloverfield triangle.

I am convinced that such arrangements should meet with the heartiest approval of shareholders, as it would open for them a prospect for dividends, at not a very distant date, and the controlling house will then be able to place this sorely reared child amongst her older and much respected sisters.—Yours, etc.,

"A MERE SHAREHOLDER."

DIAMOND COMPANIES AND PUBLICITY.

To the Editor, *S.A. Mining and Engineering Journal.*

Sir,—The touch of conscious rectitude in the reply to Mr. Hodgkins by the secretaries of the Emerald and Victory Diamond Companies is most reassuring. It would, however, be more to the point had the secretaries brought Mr. Hodgkins's letter to the notice of the chairman whom they offer to approach "in due course" should Mr. Hodgkins have the temerity to return to the charge. There are many investors in the stock of diamond companies of a speculative nature who would be glad to be taken a little more into the confidence of the directors, and a good deal of adverse criticism would be avoided were such companies to publish brief monthly—or even quarterly—reports. A noticeable feature of such reports as do receive publicity is their brevity and extreme optimism. We read that a wire has been received from the consulting engineer or manager of such-and-such a proposition stating that the existence of a true mine has been proved, or that high values have been met with and the quality of the stones is exceptional, but such brief notices are seldom amplified, and it is unusual for newspaper comment to elicit even so much as the dignified protestation of integrity which Mr. Hodgkins's letter has brought forth. In view of the paucity of the information offered—I do not refer to any company in particular—one cannot entirely exclude the idea that such reports may be intended rather to stimulate the market and to raise the price of the share than to afford shareholders—registered and unregistered—the information they have a right to expect.—Yours, etc.,

CHARLES WRIGHT.

Johannesburg,
31st August, 1921.

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ENGINEERING SECTION.

The Bessemer Steel Making Process.

By J. Bethell, of Messrs. Spear & Jackson, Ltd., Steel Makers, Sheffield.

The Bessemer furnace, or converter, is a vessel made of ¾ in. sheet steel and lined with a refractory material, such as ganister or silica in the acid process and dolomite or magnesite in the basic process. The general principle on which this process depends is, that when an air current is blown through a bath of molten iron, the carbon, silicon, manganese and part of the iron combine with the oxygen in the air, thereby evolving heat which keeps the iron in a molten condition. These facts were discovered by Bessemer, but the difficulty he experienced was that the molten metal also absorbed large quantities of oxygen and when this steel was cast into moulds it was found to be very brittle and full of blow holes (pockets of gases trapped on the solidification of the steel) which rendered the steel worthless.

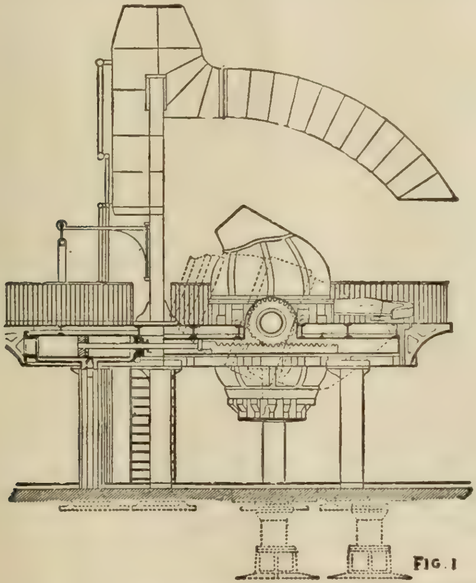

FIG. 1

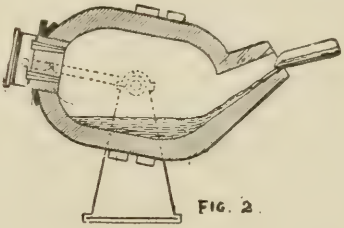

FIG. 2.

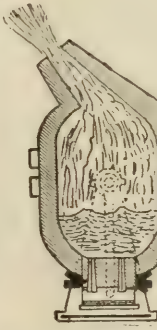

FIG 3

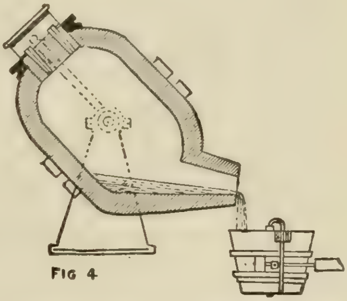

FIG 4

Fig. 1, Showing general construction of Tilting Gear. Fig. 2, Position of Converter for charging with molten iron. Fig. 3, Blow in progress. Fig. 4, Pouring finished Steel into ladle.

R. Mushet suggested the use of manganese (ferro-manganese being used) which combined with the oxygen, this addition being made just before pouring into the casting ladle. However, this addition does not eliminate the whole of the gases, and to this day occluded gas is a fault of this steel. Unlike all other steel-making processes, you must commence with your iron in a molten condition, this being produced in the cupola and transferred to the converter. It is poured into the converter whilst the converter is in the position as shown in figure 2. Before tilting your converter back to its upright position, the blast is turned on, the pressure of this air blast being from 15 to 25 lbs. per square inch. Oxidation immediately commences at the completion of which the converter is again tilted to the horizontal position, the ferro-manganese added, and the steel is poured into the ladle and cast into ingots. The addition of ferro-manganese has two purposes:

(1) The removal of excess oxygen.

(2) The addition of the required carbon.

The carbon which existed in the iron at the commencement has been removed by oxidisation and perhaps only 0·07 per cent. of carbon remains, and as ferro-manganese contains approximately 6 per cent. carbon it is easy to calculate how much to add to the bath to produce the desired percentage carbon. Steels containing more than 0·50 per cent. carbon are rarely made in the acid Bessemer process. The average Bessemer converter is of 10 tons capacity and the blow (period of oxidisation) is usually about 20 minutes. In the American practice, however, the blow is usually of only 10 minutes' duration owing to the pig irons used as a base being of very low silicon content. The capacity of the Swedish converters is decidedly less than the English practice, five tons being above the average, the blow is not completed, for instead of adding their desired quantity of carbon they stop the blow when they have reached the analysis they require. By this process steel containing upwards of 1 per cent. carbon (maximum 1·50 per cent.) can be obtained, but the English practice of complete oxidation and addition of ferro-manganese is now being largely adopted in Sweden.

Acid and Basic Processes.

The difference between basic and acid process is briefly as follows: In the acid process the lining of the furnace is of ganister or silica and owing to the chemical affinity between these materials and lime, we cannot use lime in the slag for the elimination of the phosphorus in the steel. We must therefore commence with an iron very low in phosphorus, which means that phosphoric iron ores cannot be used as a base for the acid process. In the basic process the lining of the furnace is of dolomite or magnesite and as there is no chemical action between lime and these materials, lime can be used in the slag for the removal of phosphorus. Otherwise the melting operations are much the same. These remarks apply to the Siemens-Martin process also, and in dealing with this process in a future article I shall fully explain the difference between the acid and basic processes.

Steam Transport for Johannesburg Municipality

A special technical committee made up of the Town Engineer, Town Treasurer, Gas and Electric Supply Manager, and Sanitary Manager were appointed at a recent Johannesburg Town Council meeting to report on the vexed question of mule v. mechanical transport. They had before them the previous reports of the Town Engineer (Mr. Burt Andrews), the Sanitary Manager (Mr. F. C. Gavin), and other evidence. But in addition (as is stated in the report now printed for submission to next Tuesday's Council meeting) they were "considerably helped" in their deliberations by the article of Mr. P. W. Robson, O.B.E., of Lincoln, on road transport by steam vehicles in the *Journal* of the Institution of Mechanical Engineers of October, 1920. The paragraph quoted above is the statement which Mr. Robson set out to prove, "and which in our opinion," says the committee, "he has satisfactorily answered." "It is true," the committee reports, "that in his paper, the comparison is made between steam and electric and petrol vehicles, but we consider that, as the two latter were introduced in the first instance because of the high cost of animal transport, the superiority of the steam wagon, at any rate for long distances, is correspondingly greater over animal transport." After quoting the Town Engineer's opinion that to compete with steam transport the charge for a Scotch cart should not exceed 6s. 9d. per day, or £2 14s. per day for eight Scotch carts—which is the equivalent to a six-ton steam wagon—the "Big Four" conclude: "We recognise that it would be impossible to introduce a system of steam transport that would economically meet all the Council's requirements for long and short distances, but we are of opinion that steam transport can be adopted with great advantage to the Council for the transport of 'a maximum tonnage over a maximum distance in a minimum time at a minimum cost.'" So the purchase of a Clayton, a Sentinel, and a Yorkshire steam wagon is recommended, to be fitted with a distance-recorder in order that proper records of efficiency and usefulness can be kept.

Search for Gold in East Griqualand.

In view of the fact that a gold prospecting party is leaving Kokstad shortly in order to test the possibilities of ground on certain farms in East Griqualand, near the Drakensberg Mountains, a short note on the geology of the country in the neighbourhood will not be out of place. A detailed account of the formation is given in the annual report of the Geological Commissioner of the Cape of Good Hope for 1902-1903. According to the report the formation is here made up of beds belonging to later measures of Karroo system. The occurrence of coal is also reported, but analyses show it to contain a high percentage of ash. No occurrences of gold of any note have been met with in Karroo rocks, but its presence has been reported in connection with certain igneous intrusions in the Karroo formation. A noteworthy feature of the geology of the country between the Drakensburg and Matatiele is the presence of extinct volcanoes of post Karroo age, but it is impossible to say whether the gold deposits the prospecting party have in view are in any way related to these eruptions.

Readers will probably not be unfamiliar with the mineral deposits to be found in the Insizwa range in Griqualand East. These deposits have been well described by various authorities, and in them copper, nickel, silver, gold and platinum have been found. A large amount of prospecting work has been done on these deposits, but in no cases have the mineral occurrences proved to be worth exploiting under conditions existing at the time. The Insizwa range, however, lies many miles to the south-east of Matatiele, and it is hoped that the prospecting party will meet with greater success than similar expeditions did in the Insizwa neighbourhood.

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TRADE AND INDUSTRIES SECTION.

Week in the Mining Material & Engineering Trades

BUSINESS RESTRICTED—IRON AND STEEL—TIMBER AND BUILDING MATERIALS—ELECTRICAL GOODS—TRADE CONDITIONS—AMERICAN VIEWS—BRITISH COAL MINES' ACTIVITIES—OIL—MERCHANTS AND THE TRANSVAAL—MOZAMBIQUE TREATY—FINANCIAL—IMPROVING INDUSTRIAL OUTLOOK IN BRITAIN—MOTOR FUEL.

General Review.

Business during the past week has been somewhat better than last, as the usual demands of the mines at this time of the month have helped to create a little more activity, but, on the whole, transactions have been restricted within very narrow limits. Timber has again eased off and the tendency is still downwards. Nor is the world outlook—unrest in India, etc.—encouraging. The builders' trouble is still unsettled, and while it is generally thought that the dispute will be satisfactorily settled, some influential merchants are of the opinion that the employees may go to the extremity of a strike to achieve their aims. The latest development—the desire on the part of the master builders to go to arbitration to settle the question of wages—is a step in the right direction, and it is hoped that the employees will accept and abide by such a decision. However that may be, in view of the tremendous amount of building operations hung up at the moment and very urgently needed pending a decision as to lower cost of wages, the sooner the matter is settled the better for all concerned. As regards the premium on gold (at time of writing 111s. 6d.), it is generally thought that not much change in quotations will be seen between this and the end of the year. There is at present great activity between Britain and the United States as regards foodstuffs, and it is probable that the latter's harvesting surplus will tend to maintain the present exchange; in some quarters, indeed, a further rise in the premium is looked for. The price of gold is naturally regulated by the Exchange, which in its turn is regulated by exports and imports. The British Government during the war bought its requirements at the normal levels and naturally wants to see a return to normal again. A big factor in the position is that the share market is brightening and broadening and attracting European investors, which means the influx of money into the Union to develop other propositions. It is an undoubted fact that in the past a buoyant share market has always been the forerunner of increased commercial activity. All signs point to our gold shares, especially the dividend paying ones, attracting European attention more and more, and at present levels it is difficult to see what better investments can be embarked upon. When our present temporary troubles have been satisfactorily surmounted, every month should bring us nearer the goal of improving and flourishing trade conditions. A prominent iron and steel importer received a cable this week that Belgian and French iron and steel were very firm. Goods ordered before the coal strike in Britain are coming in very slowly from England.

Iron and Steel.

Dulness has characterised this week's business apart from the usual beginning of the month's demands of the mines. Little activity has been witnessed on the Commercial Exchange or outside.

Latest quotations:—Dunswart, 29s.; Union Steel Corp., Ltd., ordinary sized rounds, flats and squares, 36s.; angles, 37s.; small angles, 38s. 6d.; small flats and rounds, 37s. 6d.; imported iron and steel flats, small, 40s. to 50s.; larger sizes, 38s. to 55s.; ¼ in. and 5-16 in. rounds, iron and steel, 45s.; ⅜ in. iron, 38s.; steel, 7-16 in., 44s.; mild steel, 43s.; ¾ in. iron, 37s. 6d.; steel, 39s. 6d.; ⅞ in. to 2 in., rounds, 39s.; larger sizes, 45s. to 57s. 6d.; ¼ in. square iron, 55s.; ⅜ in., 47s.; ½ in. to 2 in. square iron, 38s.; larger sizes, 44s. to 50s.; square mild steel, ⅝ in., 41s.; 1¼ in. to 3 in., 40s.; larger sizes, 52s. 6d. to 59s.; channels and joists, 47s. to 48s.; shafting, ⅝ in., 10¼d.; ¾ in., 10d.; 1 in., 8d. to 9d.; 1¼ in. to 2 in., 7d. to 8d.; larger sizes, 8d.; steel plates, 1-16 in., 24s. to 25s.; ⅛ in., 32s.; 3-16 in., 32s.; ¼ in., 21s. to 22s. in all sizes up to 8 x 4; 30s. to 32s. 6d. for the larger sizes. These prices are for first-grade mild steel plates; German plates are cheaper, but inferior in quality; Belgian plates are also inferior, but superior to German; spring steel flats, 8½d. to 9d. per lb.; bolts and nuts, ⅜ in., 1s. to 1s. 2d. per lb.; ½ in., 65s. per 100 lbs.; ⅝ in., 62s. 6d.; ¾ in., 60s.; nuts, ⅜ in. and ¾ in., 87s. 6d.; fish plates, bolts and nuts, ⅜ in. and ¼ in., 8½d.; ½ in., 6½d.; ⅝ in., 6d.; ¾ in., 6d. per lb.; dog spikes, 35s. per 100 lbs.; rivets, ¼ in., 1s. 3d. per lb.; ⅜ in., 10d.; ½ in., 50s.; ⅝ in., 50s. per 100 lbs.; tool steel, 3s. 6d. to 3s. 11d. per lb.; brass rods, ⅜ in., round, 1s. 7d.; ½ in., 1s. 5d.; ⅝ in. and upwards, 1s. 4d.; brass sheets, 2s. 2d. per lb.; 2s. 4d. for the lighter gauges; copper sheets, 2s. 2d. to 2s. 4d. per lb.; fire box copper, 2s. 9d. per lb.; phosphor tin, 3s. 3d.; ingot tin, 2s. 7d.; drill steel, 7d. and 8d.; hollow, 9d.; 1¼ in., 9d. to 10½d. These prices are about 4s. to 5s. per 100 lbs. less than they can be imported for from Britain, Canada or the States. Wire nails, 35s. to 47s. 6d.; shovels, 60s. to 65s.; wheelbarrows, 52s. 6d. to 55s.; picks, 37s. 6d. to 67s. 6d.; pick handles, 35s.; barbed wire, "Iowa," 66 lbs. 14 gauge, 20s. per coil; "Iowa," 98 lbs. 12 gauge, 24s. 6d. per coil; "Shorthorn," 69 lbs. 13½ gauge, 21s. 6d. per coil; plain galvanised fencing wires, No. 8 gauge 100 lb. coils, 25s. per coil; No. 10 gauge, 100 lb. coils, 27s. 6d. per coil; No. 12 gauge, 100 lb. coils, 30s. per coil; Bulb Tee fencing standards, 14 lb., 27s. 6d. per doz.; 12 lb., 24s. per doz.; black baling wire, 14 gauge, 20s. per coil 100 lbs.; screening, 3s. to 9s. 6d. per square yard; copper tubes, solid drawn, ¼ in., 3s. 9d. per lb.; ⅜ in., 2s. 11d. per lb.; 7-16 in., ½ in. and 9-16 in., 2s. 9d. per lb.; ¾ to 1⅛ in., 2s. 6d. per lb.; 1½ in. to 2 in., 2s. 3d. per lb.; 2½ in. to 3 in., 2s. 6d. per lb.; 3½ in. to 4½ in., 2s. 8d. per lb.; copper rods, ⅜ in., 2s. 5d. per lb.; ½ in., 2s. 4d. per lb.; ⅝ in. to 2½ in., 2s. 2d. per lb.; cyanide for outside mines, 1s. 6d. to 1s. 7d.; zinc shavings, about 1s. per lb.

The second-hand market for machinery is still good; there have been good inquiries this week for bar iron, long lengths, round, at about £12 to £14 per ton; steel plates, ¼ in., also at £12 to £14 a ton; girders, small and large, mixed lengths, at the same figure; second-hand pitchpine has sold at 4s. Of course the companies which have closed down lately have been a great help to the other mines and outside inquirers; but these mines and stocks are now diminishing, and later on better prices are hoped for unless other mines also fall out.

Demand for Jumper Drills.

There is a tendency just now to provide for future droughts, and there is a firming tendency in the second-hand market for bore drills. Nearly all the contractors for boreholes are now employed, and there are several inquiries for drills from private individuals for jumper drills to test their properties or to open up water on them, etc. There is still a scarcity of loco-type boilers from 10 to 30 h.p. There is a revival in the brick-making industry, as several brick-making plants have been purchased lately in town. Generally speaking, there has recently been a lot of inquiries for second-hand machinery, bar iron and steel plates.

Engineering Shops.

The improvement noticed during the past fortnight or three weeks continues, work is coming along fairly well, the beginning of the month contributing to slightly increased activity. One is impressed in the course of one's peregrinations at the amount of vitality and enterprise shown by the Johannesburg engineering community. During the last six months a prominent engineer has made at least ten different new experimental models for the improved treatment of the raw products of this country, proving that the brains of the country are adapting themselves more and more, as the state of depression necessitates, to the exploration of new fields of enterprise in devising new or improved machinery or models. If only a small percentage of these machines turns out satisfactorily it will promote the activities of this country considerably. A device which was seen this week at the Exchange Engineering Works is a particularly new and ingenious one. It is a new design of clampless hose connection, whereby the awkward clamping arrangement is no longer needed. A tapered tailpiece is inserted into the hose and the sheath nut with an opposing taper screwed on to the hose. These are being turned out to meet the special requirements of the mines in steel and in highly finished brass to cater for the demands of the ordinary public for garden hoses, etc., and if it be true that articles sell on their merits, then there can be no doubt that the old-fashioned and irritating plant, with its small bolts and nuts, will soon be a thing of the past.

The Ebbw Vale Steel and Iron Works, which have been closed for six months, throwing 8,000 men out of work, have re-started.

Timber and Building Materials.

Timber is again this week slightly easier. Business is indifferently good. 3 x 9 deals, 1s. 1d.; scantlings, 1s.; floorings, 7d. to 7¼d.; ceilings, 5¼d. to 5½d.; beaver board, 4¾d. to 5d.; pitch pine, 7s. 6d. to 8s. a cube; Oregon, 7s.; corrugated iron, 9½d. to 10½d. long lengths. Furniture timber: Burmah teak, 18s. 6d. per cube landed Johannesburg, for first quality, 14s. 9d. for seconds at the coast; American oak, 1s. 2½d. at coast; Japanese oak, 1s. 3½d. at coast; West African mahogany, 1 in. to 4 in. thick, 27s. per cube at the coast; Rhodesian mahogany, 8s. 6d. per cubic foot per truck load lots, in planks, at mills, Rhodesia; Honduras mahogany, 30s. per cubic foot; American yellow pine, 1s. 9d. per foot of 1 x 12, Johannesburg; American pine shelving, 1s. per foot on spot. Bricks are unchanged at 70s. for blue stock; 60s. for mixed; £4 10s. to £5 for wire cuts; £5 for pressed per 1,000 at kiln; white lime, 7s.; unslaked, 10s. 6d. per 180 lb. bag; blue lime, 3s. 9d.; blue plaster, 4s. 9d. to 5s.; cement, 11s. 6d. a bag; damp, course and roofing, 37s. 6d., 47s. and 55s. 3d. for 1, 2 and 3-ply.

Second-hand Iron and Timber Yards.

There is no change to report, business remaining very quiet; prices are 5d. to 6d. for iron, 10d. to 1s. for timber. A dealer in a large way of business does not anticipate a strike of employees in the building trade. He said the time for strikes was over; butter is no longer 4s. 6d. lb., and other living expenses were moderate in comparison with six or twelve months ago.

Building Activity in Far East Rand.

Provided the building trouble is settled on a satisfactory basis, great building activity is foreshadowed throughout the Far East Rand. The Brakpan Municipality, it is stated, has £100,000 worth of plans for execution; at Springs about £30,000 worth of building is being proceeded with, with plans ready for a very considerably larger amount.

Electrical Goods.

Business both in town and country is very quiet owing to the failure of a settlement as regards reduced wages in the building trade, which is naturally affecting electrical goods dealers considerably, but the general impression is that eventually the employees will accept, perhaps with a slight modification, the masters' terms. No reductions—apart from tubing, which has come down from 18s. to 15s. this week—have to be recorded, although some fairly substantial falls may, it is said, occur later on this month. All lines are now well stocked and regular consignments of electrical wares are coming in from Britain, the Continent, and also from America. The latter is selling below British,

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although still handicapped by the state of the Exchange; if it were not for that drawback a lot of stuff would be on hand here. America specialises in many lines for which Britain and the Continent do not cater, and dealers have either to get them from America or do without them. A prominent dealer said the latest advices from Home were to the effect that brassware was likely to go up as the raw material there was scarce. In electrical work, of course, more than half of the material is brass, and although copper is low at the moment, this does not affect the position materially. Continental goods continue to decline in price, Germany, Belgium and France apparently competing amongst themselves, and show a difference as compared with British of 20 to 25 per cent., sometimes even of 50 per cent.

Present Trade Conditions.

An influential merchant said that at present there are no sign of any improvement at all, in fact prices are on the downward grade still, due, he presumed, to bank restrictions or necessity for realisation on the part of merchants, as there is nothing to justify the level to which many lines have fallen just now, a lot of articles being below cost of replacement, which, of course, is not a healthy sign. There has been more demand for goods lately which, even based on the price of replacement values, is better than the previous stagnation. There are distinct signs of increased Continental competition, and the quotations submitted by Continental firms are generally speaking much lower than those made by British manufacturers. With regard to the gold premium, he thought that the present level might be maintained for a few weeks, but the recent rise was only temporary and likely to fall again shortly, and would, he thought, continue to fall until the end of the year. As regards the building trouble, he thought this was perhaps not an unmixed evil; people will have to come to their senses. The dispute had undoubtedly had the effect of holding up a lot of constructive work. The master builders wanted a cut of 6d. an hour. Personally he sympathised with the bricklayer more than with any other worker, simply because he can only work in dry weather; in wet weather he has to lie off, meaning no pay. On the other hand, he thought master builders had good grounds of complaint when a bricklayer laid only 300 bricks a day; 1,200 bricks in that time was not a hard task for good men. In his opinion the building strike would eventuate. The building employees should realise that there has to be a cut, and the leaders of the Trade Union should compromise on the matter and make the reduction, say, 3d. an hour, with the undertaking that a further cut should take place later on when costs of living falls. But there was no question that everybody had got to accept a cut, following the world's lead, before any material decrease in the cost of living could come about.

American Views on Local Conditions.

In the course of a chat with a leading American importer he stated that in connection with the labour trouble in the United States this was probably over now, and in any case the area affected was but a small part of the territory. He further said prices here were ridiculously low yet. He thought things generally in South Africa would show little improvement in the immediate future, and if they were not good for the merchant, they could not be otherwise than bad for other people. Prices were continually geting less—25s. for steel plates two months ago, now 21s., and the probability was that we should see still lower prices. What with the pressure of the banks on the smaller merchants and their necessity to sell and turn their stocks into cash, it was impossible to get anywhere near to costs of replacement in regard to many lines, and he was not speaking altogether of mining stocks. For example, in the case of an excellent article in tractors, farmers would like to buy them, but they have no money; they will offer anything except money—pigs, cheese, mealies—but it was impossible to pay the manufacturer with such commodities. Business might be considered somewhat better now than, say, six months ago, inasmuch as certain lines can now be sold by cutting prices, which was not possible some months ago, but the losses entailed by such sales were simply terrible. He mentioned the case of a firm known to him which, starting with a loss of a few hundreds in January this year, had progressively increased that loss month by month until it had attained to about £8,000 for August. Of course one could not look at one's stocks for ever, and merchants were obliged to dispose of them eventually, even at a considerable sacrifice, to make room for new goods. If values, however, continued to drop for many months longer, the mines, he thought, would not have merchants to buy from. He thought one of the main causes for the present state of depression was the action of the Union Government regarding mealies—one of the craziest actions ever done, in his opinion. The mining industry is, he said, very important for this country, but the prosperity of the farmers is based on other things than the mining industry. He thought that the gold premium would not rise above 115s. (now 111s. 6d.) within the next few months. He did not see how it was possible to stabilise the price of gold at 110s. or any other figure, and that Mr. Grey's scheme was a chimera. Gold is not worth more than formerly; we have simply got more paper, and the price of gold is to-day governed by what it will fetch on the New York Exchange.

Improving Business Conditions in America.

According to a recent cable from New York there are indications of a recovery in industrial operations and business generally. There is a slight improvement in steel. The

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harvesting returns are relatively satisfactory, especially in the middle west. The discount rate has been reduced from 6 to 5½ per cent. Automobile production is being well maintained, but exports show a decrease of over one-half and imports over two-thirds for July, as compared with a year ago.

Labour Troubles in America.

New York reports labour troubles in West Virginia, which have reached formidable proportions, culminating in an armed mob, several thousand strong, marching to Charleston from the Mingo mining district. The trouble is due to the mineowners' attempt to employ non-union labourers.

American Embargo on Dye.

It is announced that Congress has passed a Bill continuing the embargo on dye for three months.

British Coal Mines.

The latest cable advices state that the coal mines have resumed work and are producing steadily, with a consequent drop in the price of coal. While the present reductions will assist manufacturers in many branches, a still further reduction in wages is necessary before the iron and steel industries can become really active.

Oil.

The adverse report of Dr. Wagner on oil possibilities in the Carnarvon district was strongly excepted to at a meeting of shareholders of the North-Western Cape Colony Prospecting Syndicate last week, and steps are being taken to continue exploratory work with a view to finding sources of oil which it is generally stated is located in the district. Oil shares have recently had a big slump in London owing to forced liquidation, but have rallied somewhat. Vast oil deposits, it is announced, have been discovered in Haute—Loire (South-East France), and arrangements are being made for their development.

Merchants and the Transvaal—Mozambique Treaty.

Mr. Blane, the President of the Johannesburg Chamber of Commerce, at a meeting of that body during last week, said that steps appeared afoot to alter the terms of the treaty between now and April next. Dissatisfaction had been freely expressed in Delagoa Bay as to the share of the competitive traffic coming into the Union. During the past three years that share had varied between 23 per cent. and 38 per cent. of the total, whereas they were entitled to a minimum of 50 per cent., or a maximum of 55 per cent. During the present year their proportion had increased to between 38 per cent. and 44 per cent. This was more satisfactory, but the abnormal circumstances created by the late war had prevented the proper share of the import traffic falling to Delagoa Bay. The Chamber was requesting the Government that before a renewal or revision of the present treaty —which provides also for the recruiting of native labour for the mines and the reciprocal and free exchange between the Transvaal and Mozambique of their products and manufactures—the commercial community should be consulted.

Financial.

According to the latest London cables the rate for additional Treasury Bills has been reduced to 4⅛ per cent. Money has become firmer and day-to-day loans are 4 to 4½ per cent.; discount rates are 4¾ to 4⅞ per cent. New York exchange is 3.63, and it is expected that this will weaken in the autumn.

The South African Reserve Bank's ratio of cash reserves to liabilities to the public on August 27 was 83 per cent.

Improving Industrial Outlook in Britain.

Owing to the settlement of the shipyard joiners' strike, holidays in Teeside shipyards are being curtailed, and all the men have resumed work. That the industrial outlook is improving is shown in the fact that 12 blast furnaces are now operating in the Cleveland district.

Surplus Cape Wines for Making Motor Fuel.

At the recent meeting of the Natal Cane and By-products, Limited, the Chairman, Mr. W. Pearce, said an agreement had been made with the Wine Growers' Association of the Cape Province to form a new company and to erect machinery at the Paarl for the manufacture and sale of Natalite in the Cape Province, and for the surplus wines of that province to be as far as possible converted into Natalite motor fuel. The machinery was expected to be in working order in about three months. The directors were confident of establishing Natalite sales on an increased scale in the near future, notwithstanding recurring reductions in the price of petrol.

Motor Cars and Cordite.

It is stated that a new process for fusing cordite in the manufacture of artificial leather has been discovered, and that Mr. Henry Ford has purchased 17,000 tons of cordite which was made for the British Government, and which has been lying in the United States Government arsenals since the war, for that purpose.

Copper Discovery in the Shetland Islands.

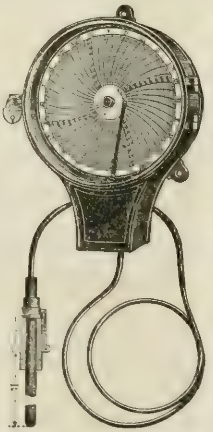
Great importance is attached to the discovery of copper in the Shetland Islands. Plant is being laid, and it is expected regular mining will begin this month.

Siberian Gold Mines.

An American financier, Mr. John Hamlin, is seeking a concession to exploit the gold mines in the Amur region, Eastern Siberia. He is asking for a concession for thirty years, after which the mines shall revert to the Government.

Metal Market.

Latest quotations: Standard copper, £67 12s. 6d. cash, £68 5s. forward; electrolytic copper, £70 10s. cash, £72 10s. forward; Straits tin, £152 5s. cash, £154 5s. forward; English lead, £23 7s. 6d. cash, £22 15s. forward; bar silver, 38d. per oz.; and fine gold, 111s. 6d. per oz.



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Issue of 2,000 Debentures at £25 each.

INTEREST 9°/₀ PER ANNUM.

Convertible into shares at par for a period of two years, otherwise repayable within from five to ten years.

The Assets consist of 150 acres of freehold ground at Newcastle. Options on five farms in Natal containing high grade Iron Ore, Houses for Employees, Blast Furnace, Substantial Buildings, consisting of Engine House, Work-shops and Foundry, Coke Ovens, Single Quarters, Offices and Laboratory, Railway Siding and Rolling Stock and a complete Brick Plant in first-class working order. The Company has also an option on the Fairleigh Colliery, within two miles of the Works, to mine coal on a royalty basis of 3d. per ton.

Owing to the largely increased cost of labour and railage the original estimates have been exceeded, but the proceeds of this Debenture issue should be ample to complete construction and equipment.

The plant has been erected in a most economical and substantial manner. It will be capable of an output of 150 tons per day, and is expected to be at work before the end of the current year.

The Managing Director is Mr. J. K. Eaton, who was one of the Founders of that very successful company, the Dunswart Iron and Steel Works, Ltd., and he is being assisted by a competent staff of practical men who have had many years' experience of Blast Furnace work and have been specially selected on behalf of this Company.

A good market for Pig Iron already exists in South Africa, which will grow as the country develops, but, apart from local consumption, the Newcastle Company will be able to compete in the export market owing to their advantages of cheaper Ore, Coke, and unskilled labour.

The Debentures are offered for subscription on the following terms and conditions:

(1) The Debentures will be made payable to the registered holders, and will bear interest at the rate of 9 per cent. per annum, from the 30th day of September, 1921, such interest to be payable half-yearly at the Company's Offices, on the 31st March and 30th September in each year.

(2) The Debentures will be secured by a duly-registered first mortgage bond in favour of the Trustees for the Debenture holders especially mortgaging the immovable property of the Company, and by a duly-registered general bond in favour of the Trustees mortgaging the movable property of the Company, present and future, and the undertaking, goodwill and business.

(3) Any Debenture holder may, by notice in writing to the Company, at any time before the 30th day of September, 1923, apply to convert his Debentures into Ordinary £1 Shares of the Company, and the Company shall on the 31st March and 30th September in each year increase its capital accordingly, and shall issue to such Debenture holders whose notices of conversion have been received at least seven days prior to the 31st March and 30th September respectively, fully paid-up Shares in the Capital of the Company equal to the amounts of their Debentures.

(4) The Company may at any time after September 30th, 1926, by giving three months' notice to the Trustees, redeem the Debentures by payment of £25 each.

(5) The principal sum secured by the Debentures shall, if not previously redeemed, become payable on the 30th day of September, 1931.

(6) The allotment is in the entire discretion of the Directors, who may decline to accept any applications, or may allot to any person or persons a less number than such person or persons may apply for; preference, however, will be given to existing Shareholders.

(7) Only applications for £25 or any multiple thereof will be accepted, and applications should be made before September 12th, 1921. Payment to be made half on application, and the remaining half on or before 30th September, 1921.

(8) Messrs. African Board of Executors, Ltd., have been appointed Trustees for the Debenture holders.

(9) For further particulars and conditions, the draft Deed of Agreement between the Company and the Trustees, and the Form of Debenture itself, are open for inspection at the Company's Offices.

D. R. McLACHLAN,
Secretary.

To the Secretary,
NEWCASTLE IRON AND STEEL, LIMITED.

Sir,—

I beg to apply for .... Debentures of the above issue at £25 (Twenty-five Pounds), per Debenture in the terms of the Company's Circular Letter, dated the 26th day of August, 1921, and undertake to accept the same, or any less number that may be allotted to me, and I enclose the required deposit of £..............., being £12 10s. (Twelve Pounds Ten Shillings), per Debenture on .... Debentures, and agree to pay the remaining half on allotment.

Name in Full ....
(Please write distinctly).

Address ....

....

Dated this .... day of .... 1921.

Yours faithfully,

Signature ....

Diamond Returns: South-Western Transvaal Diggings.

The returns from the various alluvial diamond diggings in the South-Western Transvaal for the month of July amounted to 5,919 carats, value £38,640, as compared with 5,355¾ carats, value £27,444½, in June, and 5,084½ carats, value £29,972, in May. The returns for July are officially given as under:—

	Carats.	Value.
Blesbokfontein 63	841¼	£4,979
Bloemhof 130	315¾	2,059
Bloemheuvel 171	14½	167
Biesjeslaagte 23	1¾	5
Boskop 115	6½	81
Brandywynkuil 37	15¾	45
Brakpan 156	5¼	12
Christiana	103¾	610
Cawood's Hope 79	10¾	60
Doornbult 93	23¼	198
Diamantdoorns 131	9	65
Dievedraai 245	15	110
Eerstebegin 290	24¼	125
Goodhope 78	22¼	97
Grootdoorns 133	22¾	370
Grootpoort 125	46¼	288
Ganspan 86	25	178
Goedgenoeg 593	7½	68
Holloway's Rust 142	1¼	9
Kareepan 164	251½	1,652
Kareepan 137	608¼	3,890
Kareeboom 158	661¾	4,589
Kromellenboog 108	43½	326
Klipkuil 104	39	221
Kaalpan 205	37¾	347
Kafferpan 65	3	34
Katdoornkraal 163	8	22
Kameelkuil 142	626½	4,184
London 33	300	2,454
Leeuwfontein 143	126⅜	763
Mooifontein 128	84½	451
Oersonskraal 43	10¼	32
Olivenfontein 376	40¼	207
Plessisdam 121	415¾	2,229
Palmietfontein 109	1½	8
Rietkuil 138	68½	430
Schweizer-Reneke	274	1,986
Syferfontein 107	155¾	1,165
Syfergat 150	120	831
Sandringham 25	26	90
Vuurfontein 61	13½	128
Weltevreden 136	1½	15
Zevenfontein 165	82¾	478
Zwartlaagte 68	407¼	2,582
Total	5,919	£38,640

OTHER TRANSVAAL AREAS.

Bynestpoort 520	803	£1,535
Kameelfontein 106	234	567
Total	1,037	£2,102

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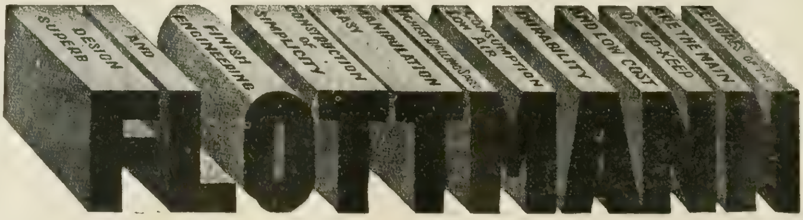

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